

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## Alexander Lyman Holley.

Alexander L. Holley, whose portrait we print this week, died at 7.30 p. m. Sunday evening, at his home in Brooklyn. He suffered from an obscure complication of diseases, but the immediate cause of death was peritonitis. In June, accompanied by his wife and daughter, he sailed for Europe. While in Belgium he was attacked by chills and fever, which he was not able to throw off. On his return to London his daughter was prostrated by typhoid fever, and for a time her life was despaired of. Mr. Holley, although business of importance called him to New York, remained in London until she was pronounced out of danger. He arrived in this city two weeks ago. His wife and daughter were to follow him as soon as the health of the latter would permit. Since his return he has been unable to attend to other business than that deemed necessary to set his private and professional affairs in order. During the last week he did not leave his room, but was constantly attended by his physicians and ministered to by loving friends. Mrs. Holley and her daughter left England in the Germanic January 19. Just before their departure Mr. Holley's physician cabled them a message that there was every hope of his recovery. The Germanic arrived on Sunday afternoon, but owing to delay in making her pier precious time was lost, and the ladies did not reach home until twenty minutes after Mr. Holley's death.

Mr. Holley was born in Lakeville, Conn., in 1832, where his father, ex-Gov. A. H. Holley, still resides. He was graduated in 1853 from Brown University, and soon afterward entered the Corliss Steam Engine Works, near Providence, R. I. His technical studies were supplemented by a year's practice as a locomotive engineer on the Stonington Railroad. He next worked for a considerable period in a locomotive works in New Jersey. During the period from 1855 to 1860 Mr. Holley published several important works. Among the most notable were a treatise on "Railway Economy" and "Reports on European Railways." He was assisted in the last-named work by the late Zerah Colburn. He crossed to England on the steamship Great Eastern on her first transatlantic voyage, and, becoming acquainted with Brunel and Scott Russell, he thoroughly studied the structure and sea-going qualities of the vessel. He subsequently made the acquaintance of the late Edwin Stevens, of Hoboken, and was engaged as consulting engineer in the construction of the Stevens battery. This work led him to visit England a second time, in 1862, for the purpose of studying the latest improvements in offensive and defensive warfare. The result of his studies was the publication, in 1864, of a treatise on "Ordnance and Armor," which has since been recognized as a standard authority. Of his work in connection with the development of the Bessemer steel industry in this country, we shall speak further on.

Mr. Holley was active in promoting and sustaining societies for the advancement of science. Three great societies—the Society of Civil Engineers, the Institute of Mining Engineers, and the Society of Mechanical Engineers, have distinguished him with official honors. He was made president of the Institute of Mining Engineers in 1875, and was one of the founders and most enthusiastic supporters of the Society of Mechanical Engineers. Of his personal character it is possible to speak only in terms of warmest praise. He was a man of rare grace and courtesy, a delightful companion and a true friend. His memory will be cherished by a circle of friends far larger than most men are known to, even by name. A brilliant man, he was wholly without vanity; a man of rare wit, he never used it without tender consideration for the feelings of others; a man who had made millions for others, he asked and received for himself far less than his services were worth. His fortune was small, and his family are left in circumstances only comfortable. If the members of the Bessemer Association do not double the estate he has left, they will show but a poor appreciation of his invaluable services to them while living.

From a paper by Mr. Robert W. Hunt, of Troy, on the history of the Bessemer manufacture in America, given to the American Institute of Mining Engineers in 1876, we compile the following facts, showing Mr. Holley's connection with that industry from its beginning. In 1863 the Kelly Pneumatic Process Company was formed, the association being composed of the Cambria Iron Company, E. B. Ward, Park Brothers & Co., Lyon, Shorb & Co., and Z. S. Durfee, Messrs. Chouteau, Harrison & Valle joining the combination some time after. Previous to the application of William Kelly for a patent, Henry Bessemer, of England, had taken out patents in this country, and in the autumn of 1862, Mr. Holley, while in England, was impressed with the importance of Mr. Bessemer's invention, and so fully foresaw its future that, upon his return to the United States, he induced Messrs. John A. Griswold and John F. Winslow, of Troy, N. Y., to join him in endeavoring to possess Mr. Bessemer's American patents. Mr. Holley returned to England in the summer of 1863, but not until the spring of 1864 did he succeed in purchasing the desired rights. Thus at about the same time there were two separate and distinct organizations seeking to control the future of the then undeveloped industry. While Mr. Durfee was abroad, his company determined to erect experimental works at Wyandotte, Michigan, with the

view of testing the adaptability of American irons to the new process. Mr. Wm. F. Durfee undertook the erection of the plant, and located it in the casting-house of the Eureka Blast Furnace. It was in these works, in the fall of 1864, under the direction of Mr. William F. Durfee, that the first pneumatic steel was made in America. In March, 1865, Mr. Ignatius Hahn assumed charge of the Wyandotte works, and during his administration several attempts were made to convert iron melted in the small cupola of a foundry attached to these works. This was probably the first attempt to utilize the cupola as a melting furnace for the Bessemer process. Mr. Holley must have been impressed at about the same time with the same idea, for the records of the Troy works show that on July 20th, 1865, the cupola was there used for the first time, and with complete success. Upon Mr. Holley's return from England, in the spring of 1864, he at once commenced the erection of a 2½-ton experi-

mental plant at Troy, N. Y., and started it February 16, 1865. While at the Wyandotte works steel was made at an earlier date, the Troy establishment was the first to bring the process near to a commercial success.

After building the first experimental plant at Troy, Mr. Holley seemed to have at once broken loose from the restraints of foreign experience, and to have been impressed with the capabilities of the new process. The result is that, mainly through his inventions and modifications of the plant, we are to-day enabled to stand at the head of the world in respect to the amount of product. As before stated, there were, in 1865, the two rival organizations claiming control of the process in this country—the Kelly Process Company, and Messrs. Winslow, Griswold & Holley. Both parties felt strong in their respective positions, and in possession of necessary means to maintain them. After spending large sums of money in counsel fees, however, they wisely concluded to put an end to their fight peacefully, and consequently, early in 1866, they combined their respective interests, the Bessemer party, or Winslow, Griswold & Holley, taking 70 per cent., and the Kelly Process Company 30 per cent., of all royalties collected. Messrs. Winslow, Griswold & Holley had, from the very first erection of their works, wisely pursued the plan of extending every facility to blast furnace owners in all parts of the country, to

have their irons tried for steel, and under this system many brands were found wanting.

The success of the Troy works whenever good metal was used, encouraged the proprietors to commence the erection of new works on a more extended scale, and early in 1867 Mr. Holley completed the new 5-ton plant, Mr. John C. Thompson then being superintendent of the manufacture. Mr. Holley at this date assumed personal charge of the Pennsylvania Steel Works. When Mr. Z. S. Durfee, who then entered upon the management of the Troy works, resigned his connection therewith, Mr. Holley once more became the manager, and upon rebuilding and remodeling the works in a great degree, particularly as to the melting or cupola house and the blowing engines. The first blow was made in the rebuilt works on January 12th, 1870. In January, 1871, Mr. Holley had a 30-inch three-high blooming train ready to run, having located it in the forge. The works con-

tinued running after being rebuilt, Mr. Holley relinquishing the management in 1871, but still retaining a connection as consulting engineer. The Pennsylvania Steel Works were the third Bessemer works started in the United States, and upon the first organization of the company, Mr. William Butcher, of Sheffield, England, was elected as the engineer, and ground was broken, but later, other arrangements were made, and the works were built upon plans furnished by Mr. Holley. Upon relinquishing the management of these works, he was succeeded by Messrs. Nourse & Pearce. The first ingots made at Harrisburg and sent to Johnstown to be put into rails, were drawn into blooms under a 5-ton hammer, and while watching the behavior of the steel during the operation, Mr. George Fritz, chief engineer of the Cambria Works, became convinced that it was not the proper manner of treating the material, and he and Mr. Holley had many consultations on the subject. Mr. Fritz at once turned up a set of blooming rolls, which he placed in a 21-inch rail train, and Mr. Holley caused 8½-inch ingots to be cast and sent him. These were drawn to 6½ inches square, then recharged and wash-heated, and then rolled into rails. So well did this work, that Mr. Holley adopted the system in the Pennsylvania Steel Company's rail mill, which he was then building. After many discussions and consul-

tations, he decided, on his return to Troy, to build the heavier blooming mill previously mentioned. The first Bessemer converter ever erected in America was built at Cambria by Mr. Kelly, and still remains there, a cherished relic. Mr. Fritz had been familiar with Mr. Kelly's experiments, and fully realized the advantages of the innovations introduced in the management and details of the Bessemer plant by Mr. Holley. These two gentlemen had been thrown during this time into the closest personal intercourse, and while Mr. Fritz was only too happy to assist Mr. Holley with his advice and experience in perfecting the plans of the rail mill for the Pennsylvania works, he was equally willing to avail himself of the latter's experience and advice in arranging his plans for the Cambria Bessemer plant. The North Chicago Rolling Mill Company, of Chicago, Ill., built and started the eighth Bessemer works. Captain E. B. Ward was one of the heaviest owners of this company, and was

fied the ladle crane, and worked all the cranes and the vessels from a single point; he substituted cupolas for reverberatory furnaces, and last, introduced the intermediate or accumulating ladle which is placed on scales, and thus insures accuracy of operation by rendering possible the weighing of each charge of melted iron before pouring it into the converter. These points cover the radical features of his innovations. After building such a plant, he began to meet the difficulties of details in manufacture, among the most serious of which was the short duration of the vessel bottoms, and the time required to cool the vessels to a point at which it was possible for workmen to enter and make new bottoms. After many experiments he introduced the Holley vessel bottom, which has rendered possible, as much as any other one thing, the present immense production. His subsequent invention of the removable lining for the converter, adapted the basic process to American practice. Considering the vast improvements brought about by Mr. Holley's untiring efforts, we cannot but pay a high tribute to his enterprise and activity.

At the May meeting of the Institute of Mining Engineers held in Pittsburgh in 1879, Mr. Holley was presented with a beautiful gift in silver by his friends and associates in the Bessemer steel interest, as a recognition of his invaluable professional services. His response to Mr. W. P. Shinn's address of presentation will never be forgotten by those who heard it, and few heard it without tears. It concluded as follows: "Among us all who are working hard in our noble profession and keeping the fires of metallurgy aglow, such occasions as this should also kindle a flame of good fellowship and affection which will burn to the end. Burn to the end—perhaps some of us should think of that, who are burning the candle at both ends. Ah! well, may it so happen to us that when at last this vital spark is oxidized, when this combustible has put on incandescence, when this living fire flutters thin and pale at the lips, some kindly hand may turn us down, not underblown—but by all means not overblown—some loving hand may turn us down, that we may perhaps be east in a better mold."

Mr. Holley was then about to leave the country for a trip to Europe, in search of health. Few of those gathered around him as he spoke really expected to see him again. He was not insensible of his condition, but his genial wit could not even then be suppressed, and his unpremeditated utterances, above quoted, show startling originality of thought and expression. An editorial article which appeared in the issue of this paper containing an account of the presentation he always afterward spoke of as "my obituary," which now, alas! must indeed be written.

**A Bankrupt Law.**—A national law of bankruptcy is urgently needed, and its immediate passage is demanded by popular sentiment in all parts of the country and among all mercantile classes. A bill prepared by Judge Lowell with much care and revised after extensive correspondence with experts, was introduced into Congress more than a year ago. A sub-committee of the Senate Judiciary Committee was at work on the subject during last summer's recess, and took the opinions of chambers of commerce, boards of trade, commercial organizations, merchants, lawyers, &c., throughout the country as to the best features of a bankruptcy law. This sub-committee has, we believe, submitted its report. It is now the duty of Congress to take up the matter without further delay and give the country the best law that can be framed. The proposition has been pushed forward from some quarter that, instead of a national law of bankruptcy, provision be made for the disposition of all bankruptcy matters under the general chancery powers of the United States courts. Such a system would have many serious faults and no advantages. We trust that no time will be wasted on this suggestion, and that Congress will give its early and earnest attention to the enactment of such a law as is demanded by the commercial interests of the country.

**"Electric Lighting for Ships and Mines"** was the subject of a paper read a short time ago by Principal Jameson, of the College of Science and Arts, before the Institution of Engineers and Shipbuilders, in the hall of the institution in Glasgow, Scotland. The lecturer stated that 1,000 or 1,500 lamps for electric lighting had been fitted up in different large steamers—some of them in H. M. S. Indefatigable, and most of the rest in first-class passenger steamers. All these lamps had been brought into use for this purpose within the past six months, and, judging from the rapidity with which they were supplanting the old oil lamps, it might be expected that ere long nothing else would be used for the lighting of ships.

The proposed scheme for conveying coal gas from the coal region to the seaboard is said to be taking a more definite shape, but it has not yet been decided whether the works will be located in the Connellsville region or in the West Virginia coal fields. It is designed to have branches from the 6-foot main to Baltimore, Philadelphia, Washington, Wilmington, New York and other cities. The estimated cost of the works and pipe is \$45,000,000, of which \$25,000,000 will be furnished in cash and the balance in bonds.



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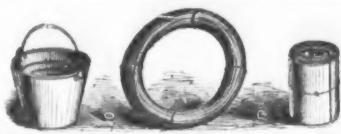
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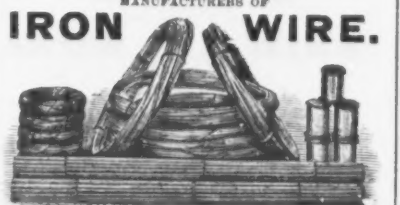
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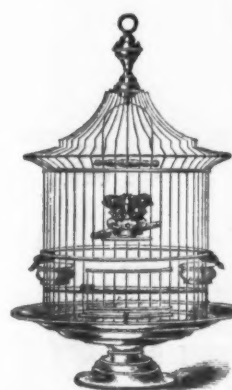
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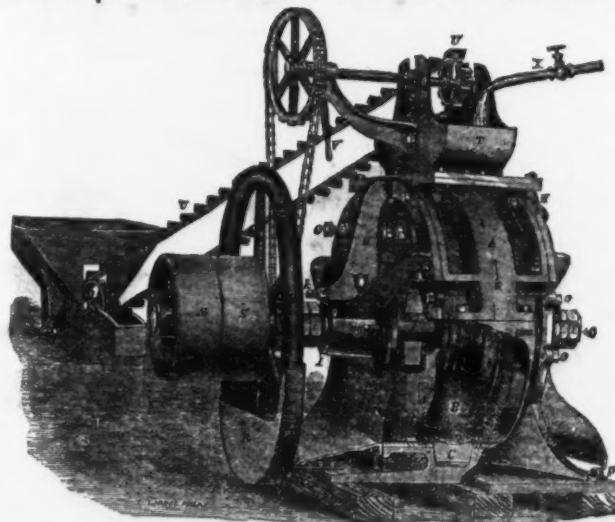
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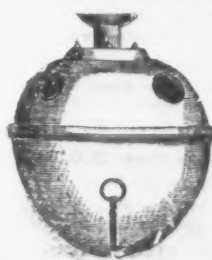
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**New Upright Power Drill Press.**

The Peerless Punch and Shear Co., of No. 115 Liberty street, this city, have recently put upon the market a new upright drill press of the kind shown in the engraving. It has 22 inches swing and is designated by the manufacturers as their "goose-neck pattern." It has been designed to meet the demand for a large drill press for general work at moderate cost. By dispensing with the outside finish not required by the working of the press, considerable economy in construction has been achieved. The working parts are well and strongly made and are carefully fitted. The spindle and shaft are both of steel. The spindle is balanced by weight in the column. The heavy base is extended back so as to support a brace that sustains the countershaft, this construction being employed in place of suspending the countershaft from the tool direct. The brace is continued up to the head

would, no doubt, be found necessary to introduce a scheme for hiring out of storage batteries upon a plan similar to that at present carried out with respect to gas meters. It is proposed in an improved form of battery to attempt to obtain a record of the quantity of electricity consumed, and thus make the battery perform the double duty of storing and measuring. Forty of the accumulators, of the ordinary size, weighing about 50 pounds each, when charged are said to supply sufficient energy to propel a tram-car carrying 24 passengers for a period of three hours. The price at present quoted for a number of these accumulators, namely, £3 each, appears to be very excessive; but the close attention which has been, and is yet being, bestowed upon the subject of storage, will no doubt, the committee think, result in the introduction of batteries of improved manufacture, giving better results and at a greatly reduced cost. Information is also given in the report with respect to the different kinds of electric



New Upright Power Drill Press, built by the Peerless Punch and Shear Co., New York

of the column, thus stiffening it at the point of greatest strain. The table is 20 inches in diameter and revolves. The arm also revolves, and both are raised and lowered by ratchet and pinion. When the table is turned the base becomes a drilling table for heavy work. For this purpose it is planed true. The spindle is provided with taper hole for sockets of Morse twist drills. The tool has a quick return motion in addition to wheel feed. The extreme height is 6 feet and the weight 1000 pounds.

**English Report Upon Electric Lighting.**

A report on electric lighting has been presented to the Gas Committee of the Manchester (England) Corporation by a sub-committee, which was deputed to attend the late electrical exhibition in Paris. The report says that in pursuance of the instructions given to them in March last, and acting upon the suggestion contained in the concluding paragraph of the report upon the inspection of electric lighting in London, which was approved by the General Committee in September, the audit, &c., sub-committee have continued their investigation of the many recent improvements in the construction of and modes of using electric lamps, and of their various appliances. In considering how the suggestion could be best carried out, the attention of the committee was frequently called to the Paris Electrical Exhibition, but it was decided not to visit it, because a similar exhibition was to be in London early in 1882. Subsequently many of the leading exhibitors in Paris refused absolutely to send their appliances to London, and it at once became evident that the Paris exhibition was in all probability the only place where the latest and fullest information could be obtained respecting the most important matters likely to affect the interests of the gas committee. Without accurate information of the present state and prospects of electric lighting, the committee felt they would neither be in a position to form a sound opinion upon the advisability of completing a portion of the new gas works, nor adequately prepared to meet opposition to their application for Parliamentary powers in relation to electric lighting. Hearing that the exhibition would close on Dec. 17, the sub-committee met on Oct. 31, when, after fully discussing the matter in the light of the information which had been gathered, they determined to appoint a deputation, consisting of the chairman or deputy chairman of the General Committee, and the chairman or deputy chairman of the Gaythorn, Rochdale Road and Street Mains sub-committees. By the assistance of the Earl of Crawford and Balcarres (the British Commissioner) and several of the leading exhibitors, the deputation were able to utilize the limited time at their disposal in a careful examination of the more important of the numerous exhibits, and in the acquisition of reliable information concerning them.

A description is given of the different machines and batteries inspected, special stress being laid upon the practical value of Faure's secondary battery for storing electrical energy. In connection with the supply of electric light for domestic purposes on Faure's system, the committee say that it

lamp in use, and the methods adopted by different inventors for distributing electricity. In conclusion the report says: "The deputation confesses that they were surprised to note the enormous development which has recently taken place in the application of electricity to industrial purposes. The improvements in carbons, lamps and regulators and in apparatus of every description connected with electric lighting, are almost innumerable. Many of the objections previously raised to the use of electricity for lighting purposes have been overcome. One of the greatest problems—namely, that of subdividing the light without loss—has been practically worked out. With the meager information obtained on the subject of cost, it is doubtless still a difficult one. The fact that the powerful companies formed for the manufacture and supply of the various apparatus are at present unable to meet the demand upon them is evidence that electric lighting is rapidly growing in public favor. There is, no doubt, ample margin in the prices at present charged for some of the lamps and apparatus to allow of a considerable reduction which would still leave a substantial profit. The Edison lamp, for instance, which is sold at 4/-, is said to cost 1/5½, while the Swan lamp, a very similar one in construction, was sold at 25/-, and it is clear that at the reduced price of 12/6 there still remains an enormous profit for the inventor. It may be noted, as indicating the position now being assumed by electricity, that one of the leading exhibitors expressed his willingness to undertake its supply at a price not exceeding the price at present charged for gas, the illuminating power to be quite equal to that of gas, and he claimed that he would at the same time realize a large profit. At each stage of their inspection the deputation became more impressed with the advantages which must necessarily result from their visit, not the least of which was the opportunity they had of explaining to the satisfaction of the chief representatives of the leading electric lighting companies the objects of the corporation in seeking Parliamentary powers for lighting by electricity. It was not unusual to hear expressions of surprise that the Manchester Corporation, with its enormous gas undertaking, did not, in common with many other corporations and companies (among whom may be mentioned Birmingham, Banbury, Blackburn, Bristol and Leeds), put in an earlier appearance at the exhibition.

The long talked of exhibition of native manufacturers was opened in Rio de Janeiro, December 12. A correspondent says it is hardly calculated to give a high idea of the manufacturing spirit of the Brazilian nation, which is, in fact, not distinguished as yet by inventive and administrative talent. Only in railroad and tram-road cars and machinery for coffee plantations is there any decided advance, and even in these it is to be recognized that in almost every case the real creator of the so-called "native manufacture" has been the foreigner or his immediate descendant.

The ship Garfield, recently launched at Belfast, Ireland, is the largest sailing vessel ever constructed of steel. Her dimensions are: Length, 292 feet; breadth of beam, 24 feet 9 inches; depth, 41 feet.



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**A New Interpretation of the Law of Patents.**

A correspondent who contributes to the New Haven Journal and Courier an interesting digest of the recent decision of the Supreme Court of the United States in the case of E. Miller & Company vs. The Bridgeport Brass Company, remarks that in that decision the court has taken a new departure, so far as is known, unforeseen either by the bench or by the bar; the new point of departure being laches imputed to the applicant for want of due diligence in applying for his reissue.

"The record in the case, as it went up, was a clean one. It called for and has met a direct ruling. The Circuit Court found as a fact that 'the descriptive portion of the reissued specification does not substantially differ from the language of the descriptive portion of the original specification.' The mistake was in the claim of the original to a combination of A, B and C, whereas the claim should have been to two independent features—i. e., the combination of A and B as well as the combination of A, B and C. The Supreme Court does not go so far as to insist that such mistake in the claim can in no case be corrected. It says: 'If the mistake is apparent on the face of the patent and can be discovered as soon as that document is taken out of its envelope and opened,' the patentee may at once return it to the Patent Office and say, 'I omitted this,' or 'My solicitor did not understand that,' and his application may be entertained and on a proper showing a correction made. But if he omits to do this 'his omission to claim other devices or combinations apparent on the face of the patent is in law a dedication to the public of what is not claimed. It is a declaration that that which is not claimed is either not the patentee's invention, or, if his, he dedicates it to the public.'"

"If two years' public enjoyment of an invention with the consent and allowance of the inventor is evidence of abandonment and a bar to an application for a patent, a public disclaimer in the patent itself should be considered equally favorable to the public. Nothing but a clear mistake or inadvertence and a speedy application for its correction is admissible when it is sought merely to enlarge the claim.' But there is in this case another new departure. It has been uniformly held by the Supreme Court, as well as in all the circuits, that the jurisdiction of the Commissioner of Patents was exclusive over the question of fact, whether the original patent was or was not inoperative by reason of inadvertence or mistake, and that this judgment was so far final as to leave open to the courts only the question whether the two patents were for the same invention. But the Supreme Court says: 'In reference to reissues made for the purpose of enlarging the scope of the patent the rule of laches should be strictly applied; and no one should be relieved who has slept upon his rights, and has thus led the public to rely on the implied disclaimer involved in the terms of the original patent. And when this is a matter apparent on the face of the instrument upon a mere comparison of the original patent with the reissue, it is competent for the courts to decide whether the delay was reasonable and whether the reissue was therefore contrary to law and void. We think that the delay in this case was altogether unreasonable and that the patent could not lawfully be reissued for the purpose of enlarging the claim and extending the scope of the patent.'"

"The practical effect of this decision would seem to be that all reissued patents with claims broader than those of the original patents are void, unless the patentee has used 'due diligence' in the correction of an 'actual mistake,' and that two years from the date of the original patent is the limit within which he can be permitted to raise the question of due diligence. Beyond that period the law assumes a dedication to the public of every feature of the original patent not included in its claims. It is true the decision applies this rule in terms only to patents where the mistake is apparent on the face of the original patent. But reissues have always been held void if, upon comparison, the claimed mistake was not apparent on the face of the original patent. There is much force and too much truth in the court's recital that, 'Those afterthoughts, developed by the subsequent course of improvements and intended by an expansion of claims to sweep into one net all the appliances necessary to monopolize a profitable manufacture, are obnoxious and open to grave animadversion.'"

"The evils which have grown from the practice have assumed large proportions. Patents have been so expanded and idealized years after their first issue that hundreds and thousands of mechanics and manufacturers who had just reason to suppose that the field of action was open, have been obliged to discontinue their employments or pay an enormous tax for maintaining them.' But it is to be regretted that the Supreme Court has reserved its announcement of what must now be accepted as the law upon this subject so long that the remedy it prescribes for the evils which have grown up under the sanction of its previous decisions must impair large amounts of invested capital."

The comparative strength of wire and manila rope was severely tested in the attempt of the Persian Monarch to tow the disabled steamer Edam, as reported on the 18th Inst. The tow line, as described by Captain Duncombe, was a composite affair, the two ends being of manila and the central portion of wire, the whole attached to the steamer by a spring. In repeated efforts the manila yielded every time, and at last "went to pieces," so that the Edam was abandoned to her fate. The wire portions remained intact.

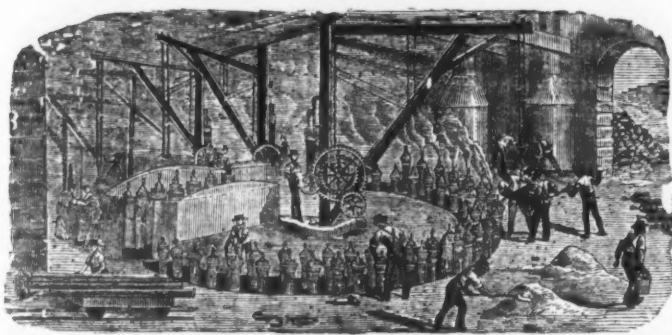
One of the hardest woods in existence is that of the desert ironwood tree, which grows in the dry washes along the line of the Southern Pacific Railroad. Its specific gravity is nearly the same as that of lignum vitae, and it has a black heart so hard, when well seasoned, that it will turn the edge of an ax and can scarcely be cut by a well-tempered saw. In burning it gives out an intense heat, and charcoal made from it is of unequalled quality.



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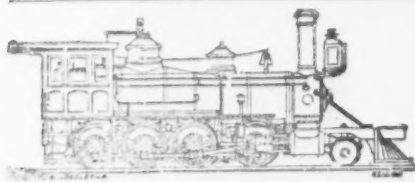
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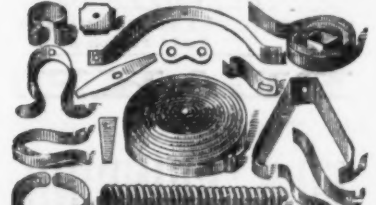
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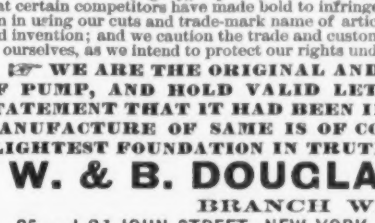


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**METALLURGICAL NOTES.**  
**A NEW MINERAL.**  
 Prof. George A. Koenig, of the University  
 of Pennsylvania, describes, under the name  
 of Alaskaite, a new mineral belonging to the  
 series of bismuth sulpho-salts. The new  
 mineral is found in the Alaska vein, in  
 Poughkeepsie Gulch—one of the head forks  
 of the Uncompaghe River in Southwestern  
 Colorado. The Alaskaite occurs in the vein  
 associated with gray copper in a gangue of  
 quartz and barite. It is found in small  
 foliated particles, with smooth cleavage  
 planes occasionally observable. Its color is  
 whitish lead gray, and its luster is strongly  
 metallic. Its hardness could not be deter-  
 mined, but the mineral is easily friable in the  
 mortar; specific gravity was found to be  
 6.878. Before the blow-pipe the mineral  
 gave evidence of the presence of lead, silver,  
 bismuth and sulphur. It dissolves completely  
 and rapidly in hot concentrated hydrochloric  
 acid.

**IRON ORE ANALYSES**  
 Two recent analyses of the iron ore from  
 the Crystal Falls iron mine in the Lake  
 Superior region, shows the following results:  
 Metallic iron, 70 1/2 per cent., with only 1 per  
 cent. of silica, and but a trace of phosphorus.  
 This is probably the richest one that has  
 been found in that region. The ore is a  
 handsome blue-colored specular, but scratches  
 red.

**NATIVE SILVER IN IRON ORE.**  
 At a recent meeting of the Austrian So-  
 ciety of Engineers, specimens of native silver  
 were shown which occur under peculiar cir-  
 cumstances on the East coast of Spain, in  
 the Province of Almeria, Las Herrerias,  
 near the Mediterranean. The Phoenicians  
 and Romans mined in that locality, but prob-  
 ably stopped work during the fifth century.  
 Mining now is almost entirely confined to a  
 hill about 100 feet high, consisting almost  
 entirely of iron ore, a hematite more or less  
 manganiferous. Through it run several  
 veins of heavy spar. Along the northern,  
 eastern and southern part of this hill, which  
 stretches toward the North for a distance of  
 about 500 feet, the iron ore is covered by a  
 bed of marl, the so-called *laguena*, which  
 has a thickness ranging between 100 and 500  
 feet. Below the marl, and above the iron  
 ore, is a bed of "flint," about 1.5 feet thick.  
 In places this flint is fissured and then forms  
 rounded fragments, which have the appear-  
 ance of having been acted upon by long roll-  
 ing in water. In the northeastern part of  
 the marl are several beds of galena, low in  
 silver, which are called *mantos*. The latter  
 have been worked for 40 years, no one hav-  
 ing a suspicion of the rich silver ores lying  
 below them until that metal was discovered  
 in the layer of flint. The silver, which is  
 generally native, occurs more frequently in  
 the heavy spar, and is occasionally found, too,  
 in the iron ore proper, especially when it is  
 lower in manganese. The texture of the sil-  
 ver is peculiar, it having a sandy appearance,  
 and this, combined with the rounded shape  
 of some of the flint, led to the idea that the  
 whole might possibly be the result of the  
 destruction of distant veins carried to the  
 present site by water. Against this theory  
 of an alluvial deposit, it should be noted that  
 the vicinity is crossed by many dikes of  
 trachyte and basalt. The marl contains  
 shells and the teeth of fish belonging to the  
 Miocene, the former often showing a crust  
 of galena.

**REFINING PIG IRON.**  
 The Hamoir practice of refining pig iron  
 tapped from the blast furnace by blow-  
 ing hot air through it, has been in use at  
 Moubegue, France, for a number of years,  
 and has made it possible to get ten charges  
 instead of nine out of a puddling furnace,  
 the consumption of fuel being reduced 10  
 per cent. The following analysis of crude  
 (No. 1) and refined (No. 2) pig will readily  
 explain this:

	No. 1.	No. 2.
Sulphur.....	0.037	0.024
Phosphorus.....	1.710	1.440
Silicon.....	1.100	0.690
Carbon.....	4.100	2.800

According to Prof. N. Jossa, this process  
 has been in use at Nisuje Tagilsk, Russia,  
 since 1878, where a 2-ton charge is refined  
 in from 8 to 15 minutes, the waste being  
 from 10 to 12 per cent.

**DURABLE MOLDS FOR CASTING.**  
 Doctor Schlaegel, of Hoyerwerda, Ger-  
 many, manufactures molds for casting from  
 clay and brown coal. Pure clay is ground very  
 fine and kept dry for use. The coal is also  
 ground to a degree which is variable accord-  
 ing to the kind of casting warranted. The  
 clay and the coal are well mixed together,  
 and when the clay is of good quality, a mix-  
 ture of the two in equal proportions will do  
 for most purposes. Chamotte meal may be  
 added to make the mold harder, but is not  
 absolutely necessary. The mixture is worked,  
 after the addition of water, into a stiff mass,  
 which is used for the molds, the latter being  
 made in a manner similar to sand molds, and  
 dried slowly. When dry they are washed  
 with a dilute solution of soluble glass, and  
 dried again, this operation being repeated  
 three or four times. When perfectly dry,  
 the mold is burned to give it a glossy appear-  
 ance.

**STAR METAL.**  
 This mineral compound, recently patented,  
 is an economical and efficient mixture re-  
 sembling a metal, and being a most excellent  
 substitute of lead. It resists climatic in-  
 fluence and has already been successfully  
 used, giving reason to believe that it will in  
 future be very generally adopted. The "Star  
 Metal" is applicable to a number of purposes,  
 being especially valuable in joining gas and  
 water-pipes. For joining pipes the tests  
 made have been all that could possibly be de-  
 sired, and its merits have been recognized by  
 the South Metropolitan Gas Works, London,  
 where it has almost entirely superseded lead  
 and other similar metals, a license having  
 been granted to this company by the patentee  
 to manufacture it for their own purposes.  
 As regards economy, a ton of this compound  
 costs considerably less than an equal weight  
 of lead, and as the saving effected is a mani-  
 fest advantage, this fact should not be for-  
 gotten, another point being that this is  
 alleged to do as much work as three tons of  
 lead. The metal is very fluid, and its melt-  
 ing point being comparatively low (350°  
 Fahr.), little fuel is required to keep it in a

condition of fluidity to render its working  
 easy. In cooling it expands, filling up effec-  
 tually the joint or mold and securing thorough  
 tightness of the joints. The compound is not  
 affected by gas or water, acids or alkalies,  
 and it is a reliable non-conductor of heat and  
 cold. On the surface a fine polish, with  
 bright metallic luster, is secured, and it will  
 not crack when left unpolished. It would  
 be difficult to enumerate the many purposes  
 to which the "Star Metal" can be applied  
 with advantage, and we will merely state  
 that it may be used for covering or repairing  
 any kind of roofing; it renders walls free  
 from moisture, and as a covering for the sur-  
 face of walls it is thoroughly effective.

**THE BASIC PROCESS IN GERMANY.**  
 The last issue of *Stahl und Eisen* contains  
 full particulars concerning the recent meet-  
 ing of the Iron and Steel Institute at Dussel-  
 dorf, Germany, on which occasion Mr.  
 Brauns gave some account of the progress of  
 the basic process in Germany. It was con-  
 cluded from experiments made at the Dort-  
 mund Union Steel Works and by the Hörd-  
 er Verein, that there was no difficulty in ob-  
 taining good results as regularly as with  
 ordinary Bessemer steel. The steel pro-  
 duced by the basic process, moreover, pre-  
 sented special advantages for the manufac-  
 ture of railway material, especially rails,  
 27,000 tons of which had been produced by  
 the Hörd Verein within the past two years;  
 the Rheinisch Steel Works have during the  
 same time yielded some 50,000 tons. The  
 result will very probably be that much of  
 the steel which is now imported into Ger-  
 many for strip-plates and other uses will be  
 replaced by the cheaper and better material  
 which is manufactured in Germany. Mr.  
 Brauns stated that the difficulty of obtaining  
 suitable iron to be treated by the basic pro-  
 cess had been greatly exaggerated. Experi-  
 ence has shown that the manufacture of a  
 suitable basic pig is easier and cheaper than  
 the manufacture of ordinary Bessemer pig.  
 It was found, moreover, that the output of  
 a furnace yielding basic pig exceeded the  
 production of a furnace yielding Bessemer  
 pig by from 25 to 30 per cent. The districts  
 that would most benefit by the general adop-  
 tion of the basic process are Lorraine and  
 Luxembourg, it having been estimated that  
 the latter district contained about 290,850,000  
 tons of oolitic iron ore, while the deposits  
 of the former amounted to nearly 2,100,000-  
 000 tons. The only serious difficulty opposed  
 to the successful working of these ores ac-  
 cording to the basic process is found in their  
 high percentage of sulphur (.3 to .4 per cent.)  
 and low percentage of manganese. The  
 brown-ore region of Bonn and the blackland  
 region of Dortmund also deserve mention as  
 containing considerable deposits of ore. In  
 the discussion following Mr. Brauns' remarks,  
 several estimates were given concerning the  
 difference in the cost of production, but no de-  
 finite values were stated, the representatives  
 of the Rheinisch Steel Works, where the process  
 has been in use for the past two years, not  
 seeming disposed to throw any light upon the  
 subject.

**A Steel Steamboat.**  
 Among the complete and costly steamers  
 recently built at Pittsburgh, none have pos-  
 sessed points of more interest than the  
 Chattahoochee, now receiving her finishing  
 touches at the foot of Market street. Her  
 chief peculiarity lies in the fact that her  
 hull is the first one constructed entirely  
 of steel which has been built in this coun-  
 try. Steel hulls have been built in Pitts-  
 burgh by James Rees, but in these the braces,  
 angles, &c., were of iron. In the Chatta-  
 hoochee hull steel is solely used, and her  
 success in far-off waters will be watched  
 with interest. The steel plates used vary  
 from a "light" 3-16th inch in thickness, up  
 to 1/2 inch, according to their locality in the  
 hull. On Monday the Chattahoochee will  
 turn her prow down the Ohio. At New  
 Orleans, after discharging freight, she will  
 follow the coast of the Gulf, doubling the  
 southernmost point of Florida, and finally  
 reaching her destination, if all goes well,  
 at Columbus, Ga., 375 miles from the  
 coast. The contract for the boat was let  
 to Capt. James Rees, of the Duquesne  
 Engine Works, by the Peoples' Line, of  
 Columbus, Ga., through their agent, Capt.  
 T. H. Moore, for the sum of \$47,000. The  
 requirements of the trade call for a boat  
 of light draft, strength and speed, and cer-  
 tainly all these seem to be embodied in the  
 Chattahoochee. Her hull is 153 feet  
 long, 31 1/2 wide and 4 1/2 deep. She is a  
 stern-wheeler, with engines of 15-inch cylin-  
 der and 5-foot stroke, fitted with the Rees  
 "cut-off" and other modern improvements.  
 Her wheel is 18 x 24 feet, with steel shaft.  
 In fact, there is probably more steel about  
 the Chattahoochee than any boat of her size  
 afloat. Her boiler deck is arranged for car-  
 rying 1200 bales of cotton, which, with the  
 passengers and general freight, will com-  
 prise her cargoes. Her cabin is extremely  
 pretty in design and finish, having accommo-  
 dations for seventy-five persons. The upper  
 cabin, or "Texas," will accommodate twenty-  
 four colored passengers. Five electric lights  
 will make the Chattahoochee a thing of  
 beauty by night as she awakens the echoes  
 of the Appalachicola, Flint and Chattahoo-  
 chee rivers. Her draft, light, is only 23  
 inches, and altogether she is a craft calculated  
 to widely advertise the fame of Pittsburgh  
 mechanics.

In the patent case of Hammerschlag  
 against Messrs. Garrett & Buchanan, the  
 opinion of the United States Circuit Court,  
 prepared by Judge Butler, has been filed.  
 The opinion begins as follows: "Subse-  
 quently to the injunction in this case the de-  
 fendants constructed a machine correspond-  
 ing to a section of the old Anderson machine  
 (the patent for which had expired) and con-  
 tinued the manufacture of waxed paper by  
 this means. The plaintiff, charging that the  
 process thus employed infringes his patent,  
 as described in the fifth claim, asks for an  
 attachment to prevent its further use and to  
 punish the alleged disregard of his injunction.  
 After a full consideration of all the questions  
 raised in the case, the Court came to the con-  
 clusion that the defendants do not employ  
 the process described in the fifth claim of  
 the plaintiff's patent, and for that reason the  
 motion for an attachment is refused."



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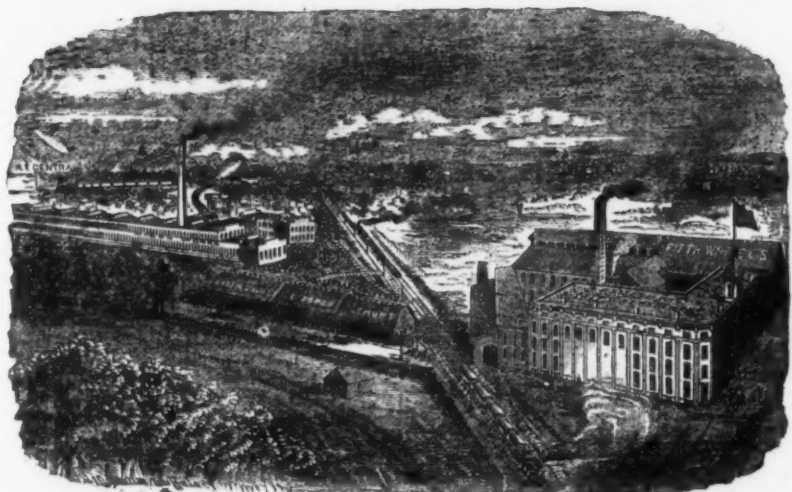
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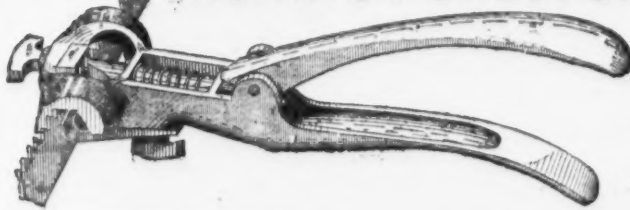
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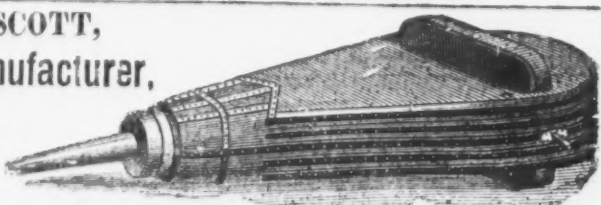
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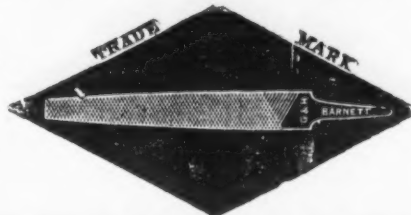
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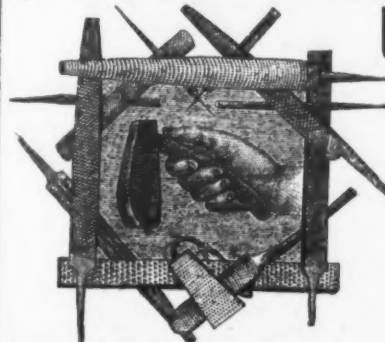
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# A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH

## WIRE NAILS,

TACKS, SHOE NAILS,

And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

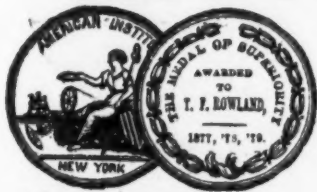
Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

## DOC'S PREMIUM ELEVATOR BUCKET.



ALWAYS FIRST  
COMPETITIVE



PREMIUM IN  
TESTS.

This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 50 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 100,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the DOC'S BUCKET has caused many manufacturers of the old style of Elevator Bucket to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

T. F. ROWLAND, Sole Manufacturer, Continental Works, BROOKLYN, N. Y.

The Mill Bucket, in sizes from 3 1/4 to 16 inches.

### OLD COLONY RIVET CO., Kingston, Mass.

(Established 1866.)

#### Manufacturers of NORWAY IRON RIVETS of Superior quality.

We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barret, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

WILLIAM H. DUNBAR, President.      HENRY HOBART, Treasurer.  
JAMES L. HALL, General Agent and Manager.

We carry the most complete stock in the city with our New York agents, *The American Tack Co.*, 115 Chambers St.

John Chatillon & Sons,  
91 & 93 CLIFF ST., NEW YORK.



Manufacturers of  
**SPRING BALANCES**  
Patent Balances,  
UNION AND COUNTER  
**SCALES,**  
SPIRAL SPRINGS,

Send for Illustrated Price List.

**ESTERBROOK'S**  
STANDARD  
and  
RELIABLE

FOR SALE  
BY ALL STATIONERS.

ESTERBROOK STEEL PEN CO.  
Works, Camden, N. J.      20 John St., New York

## THE ANSONIA CORRUGATED STOVE PLATFORM.



With Patented O. G. Border.  
**ROUND ZINC.**  
27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

Send for List and Discount.

Packed 12 in each case.

## PURE ELECTRIC WIRE,

Manufactured by the

ANSONIA BRASS AND COPPER COMPANY,

For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Spitzdorf's patented Liquid Insulation, covered with cotton or silk.

All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,

For Clocks, Indicators, Telephones, Call Bells, Bell Patches, Steamboat and

Railroad Use. Burnished or Nickel Plated.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

## ESSEX HORSE NAILS.

Hot Forged, from Norway Iron, Warranted Best Quality, Pointed and Polished.

HOWE & CO., Troy N. Y., Sole Agents.

### The Outlook for the Anthracite Trade.

A correspondent writing from Mauch Chunk, Pa., says:

Since the long to be remembered "long strike" of 1875, when the Pennsylvania State militia was called into requisition to preserve the peace in the lawless districts of the Lehigh coal region, there has been no dissatisfaction among this mining population, which is acknowledged to be the most industrious and orderly of any in the anthracite-producing country of the Keystone State, the German element largely predominating. Notwithstanding the general prevalence of quiet and pleasant relations between the operators and miners and laborers, agitators from the Wyoming and Lackawanna districts have, by smooth language, inspired some feeling of dissatisfaction and discontent among several of the nationalities represented by the colliery operatives. The inside employees at the Hazleton collieries, and at Lattimer, Hollywood and Mount Pleasant have met, and agreed to accept the offer made to them by their employers, to work on the same terms in 1882 as were paid in 1881. The miners and laborers at Lattimer, Mount Pleasant and Hollywood also agreed to accept the proposition made by their employers, viz., to pay \$50 in the event of a fatal accident in their mines, and to defray funeral expenses, provided each miner would contribute \$1, and each laborer 50 cents for the benefit of the family of a person killed. While this amicable arrangement has been agreed upon by the colliers and operators of the immediate Hazleton district, the men employed elsewhere are evidently disposed to join with their grumbling brethren of the Northern coal fields of the Wyoming and Lackawanna Valleys, and begin a strike for an increase of the present schedule.

During the winter of 1874-75 the Miners' and Laborers' Benevolent Association and the Miners' National Association were quite strong, both in membership and financial resources, the former organization being very influential in the Lehigh region, while the latter was equally prominent in the districts of Wyoming and Lackawanna, where John Siney, the then executive head of the Miners' National Association, had for several months been working up an enthusiasm among the workmen, and had secured large accessions to the rolls of the order, whose influence and membership extended to every part of the United States where coal mining operations are carried on. It is estimated that between 50,000 and 75,000 colliers were enrolled under the standard of the Miners' National Association within a few weeks, the largest proportion of the membership being represented by the miners and laborers employed in the mines of Pennsylvania. After a bitter contest between the mine owners and malcontents, the latter succumbed and returned to work upon the basis of wages which the operators had offered to the miners' committee at Hazleton, on December 31, 1874.

The unions were disrupted and bankrupted and the officers, apprehensive of punishment for offenses for which they were amenable to the law, disappeared from the coal country. It was generally believed when the Miners' and Laborers' Benevolent Association and the Miners' National Association collapsed, that no attempt would ever be made to re-establish a union for the protection of the workmen's interests; but it seems that the idea was erroneous. A short time ago a movement was started in the middle coal fields to reorganize the M. L. B. A., and so successful did the enterprise prove that within a few days several lodges were formed, the membership being quite large. From that time unionism has become a thing of strength among all classes of colliery operatives, and it is estimated that nearly, if not quite, one-half of the miners and laborers employed in Schuylkill, Carbon, Northumberland, Columbia, Luzerne, Dauphin, Lackawanna and Wayne Counties are members in good standing of the Miners' Union. The chief agitators in the threatened gigantic strike are the men of the Wyoming and Lackawanna regions, where a very aggressive and powerful element exists. The meetings have been held by the employees of the Lehigh and Wilkesbarre Coal and Iron Company, and while they have temporarily accepted the situation and the wages proposition offered them by Charles Parish & Co., the mine owners, the trouble is not ended. The men of those two influential corporations, the Pennsylvania Coal Company and the Delaware and Hudson Company, have been approached by the emissaries of the union, a id, while not actually consenting to take part in an organized aggressive movement for an increase of wages, have given a half-hearted promise to assist the discontents should a strike be inaugurated. This simply means that if the Wyoming colliers make a successful fight for better compensation, the present non-combatants will assist in the contest.

Iron and Copper Products of Lake Superior.—The following are the statistics of the Lake Superior copper product for 1881:

	Tons.	Lbs.
Calumet.....	19,452	432
Quincy.....	3,407	1,105
O'ceola.....	2,453	666
Franklin.....	1,615	1,091
Isabella.....	1,074	1,000
Algonquin.....	1,185	1,510
Central.....	1,003	615
Copper Falls.....	910	1,445
Hancock.....	459	312
Phelps.....	440	508
Conglomerate.....	373	1,000
Huron.....	215	1,738
Marysville.....	149	1,493
Ridge.....	119	914
Nonesuch.....	117	1,740
Chippewa.....	104	611
Minnesota.....	85	240
Quincy.....	17	2,554
Quincy.....	9	259
Flint Stn.....	3	668
Astoria.....	5	1,800
Adven ure.....	4	1,614
Eve green.....	1	1,810
Bundry t-lusters, estimated about.....	200	...
Grand total.....	34,174	41

We presume the above figures refer to mineral; if so, the product of refined copper would be about 28,000 net tons, of the approximate value of \$11,000,000. This, added to the value of the product of our iron mines, would give a total of about \$31,000,000 as the gross earnings of the iron and copper mines of Lake Superior in 1881.—*Marguerite Mining Journal.*

### The Oswego Iron Works.

The Portland Oregonian says that although several important iron-ore deposits are known to exist in Oregon and Washington Territory, but two companies are doing anything in the way of developing them. These are the Oswego Iron Works, located seven miles South of Portland, and the Irondale Iron Works, near Port Townsend, W. T. The latter has been established but a short time, and is operated by California capital. A furnace has been erected, and some work done, but no figures have been ascertained as to the amount. The Oswego Iron Works have been established since 1866, their first blast having been blown in on the 22d of August in that year.

The plant of the Oswego Company is located on the West bank of the Willamette River, the mine being three miles from the huge blast furnace, with which it is connected by a railroad, over which the ore is carried by a train of six cars, each capable of holding 5 tons. The mine is well developed by tunnels, shafts and inclines, and yields an abundance of ore. The dangers arising from choke damp and other vitiated air are obviated by a hot-air furnace, pipes from which lead through all the galleries and afford a purer atmosphere to the miners employed there. The ore of the mine is brown hematite of an excellent variety, and yields 40 per cent. of pure metallic iron. The average daily output is 100 tons, all of which is shipped to Portland and California foundries for manufacture into various articles of utility. It is estimated that there is now in sight ore enough to last fifty years, at the least calculation, taking into consideration the prospective growth of the country and consequent demand for pig iron. The limestone used as a flux in the furnace comes from Washington Territory, and the sand used from the Sandy River. About one hundred and fifty Chinamen are employed in cutting and burning the wood into charcoal, and thirty white men engaged in hauling it to the works. Some three hundred men are employed about the mine and works altogether.

The blast furnace is a large structure, 42 feet in height, capable of turning out 20 tons of pig iron daily. The company completed one blast of 8000 tons during the past summer, and are now busy turning out another. The quality of the iron made at Oswego is considered superior to any other on the Pacific coast, and equal to the best produced in the United States anywhere. The sales of the company for 1881 will reach a figure in the neighborhood of \$200,000. Next year, with its prospective increase in demand and better advantages for turning out ore, this amount will doubtless be much increased. From its first inception it continued in operation until April 8, 1869, during which time it produced 2375 tons. The furnace was then blown out and remained idle until March 13, 1874, when it was started up again and ran until September, 1876, during which period it produced 5075 tons of metal. The property was sold at sheriff's sale in September, 1877, to satisfy a judgment of creditors, to the Oswego Iron Company, the present proprietors. The latter again started the furnace in June, 1878, and ran until November of the same year, producing 1170 tons. In the following winter the furnace was remodeled and its size and capacity greatly increased. It was blown in again in April, 1879, and continued until the 1st of September of the year just ended, when changes were again made as mentioned above. The company own several thousand acres of land, and have an ample field for any amount of development they may choose to undertake. The close proximity of their plant to a market, and high value of the ore produced, will give it an advantage over future works, and it will probably be the location of a number of extensive suburban iron industries within a very few years. Some time ago the company constructed a canal from the Tualatin River to Sucker Lake, a distance of two miles, but notwithstanding the excellent water supply the company intend to run the new air blast next year with steam power.

### A Street Car which Carries Its Track.

The Accommodation Car Company has begun operations in Chicago with a capital stock of \$1,000,000. The object of the company is to build and equip 1000 cars and put them upon the streets of Chicago. The car is the patent of Mr. Prosser, and as regards present appearance is a queer-looking craft, which carries its track along with it, and to all intents and purposes is designed to traverse any and all lines of streets. The car, which is of the ordinary kind, is mounted in the middle upon a truck which sits on four wheels, each about 1 foot in diameter. These wheels run around the inside of two steel tires, each 10 feet in diameter, and which rest upon the ground, and are held only to the car by a set of wheel clamps. The car is designed to hold 50 people, and the owners claim that the more it carries the easier it runs. It will be stopped in the usual manner, and two horses will be required to pull it. The company say they intend putting the cars upon the principal streets of the city.

Accounts from Chili represent that eight torpedo boats have been sent out from England in fragments, without exciting observation, and that compound armor plates for war steamers are on their way, in addition to some 30-pound Armstrong guns, expected before long. A correspondent at Valparaiso says: "One cannot help admiring the energy, promptness and ability displayed by the Minister of Marine. With no navy yard of her own, Chili gets her work satisfactorily performed by private parties. Her squadron is in an efficient condition, and well supplied with all the latest adjuncts of naval warfare; swift and handy torpedo boats for offense, machine guns (Gatlings, Nordenfolds and Hotchkiss), with improved electric lights for defense against torpedoes. The Huacavir is being rapidly and thoroughly overhauled, transports put in order, new regiments enlisted and every preparation made to meet a formidable antagonist." There are some who are wondering whether a South American roster is equal to the American eagle, but in a match of that kind there would be neither glory nor profit.



# RUSSELL & ERWIN MANUFACTURING COMPANY,

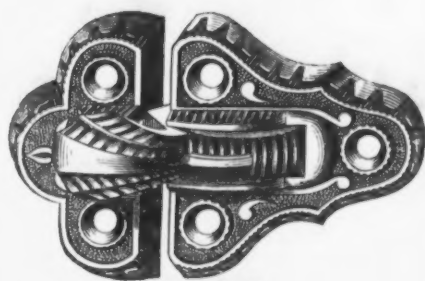
New Britain, Conn., U. S. A.

## Manufacturers of BUILDERS' AND OTHER HARDWARE,

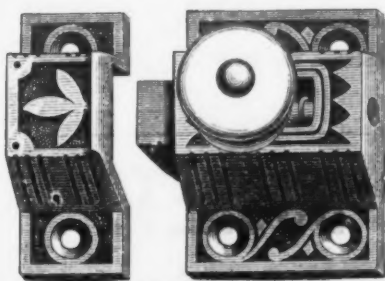
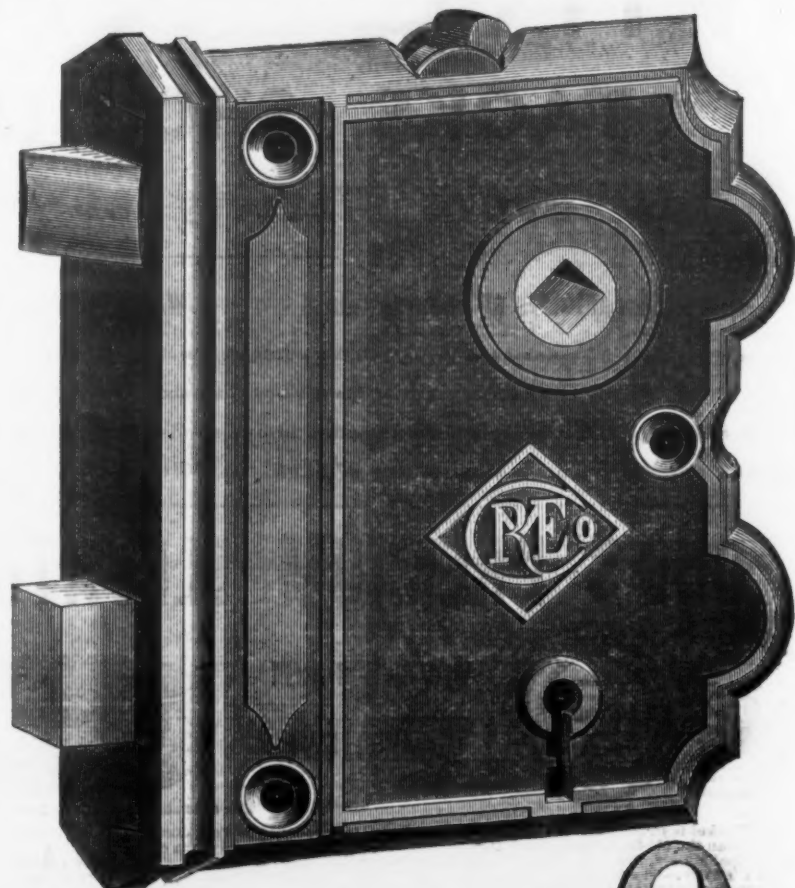
### IRON AND BRASS WOOD AND MACHINE SCREWS.

MANUFACTURERS' AGENTS AND DEALERS IN GENERAL HARDWARE AT OUR

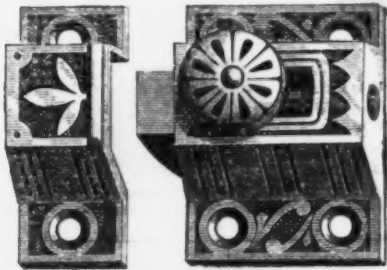
WAREHOUSES: NEW YORK, 45 & 47 Chambers St.; PHILADELPHIA, 425 Market St.; BALTIMORE, 17 South Charles St.; LONDON, 47 Upper Thames St.



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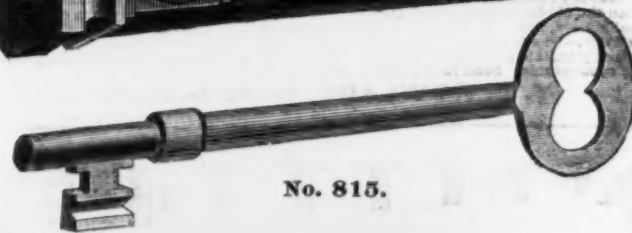
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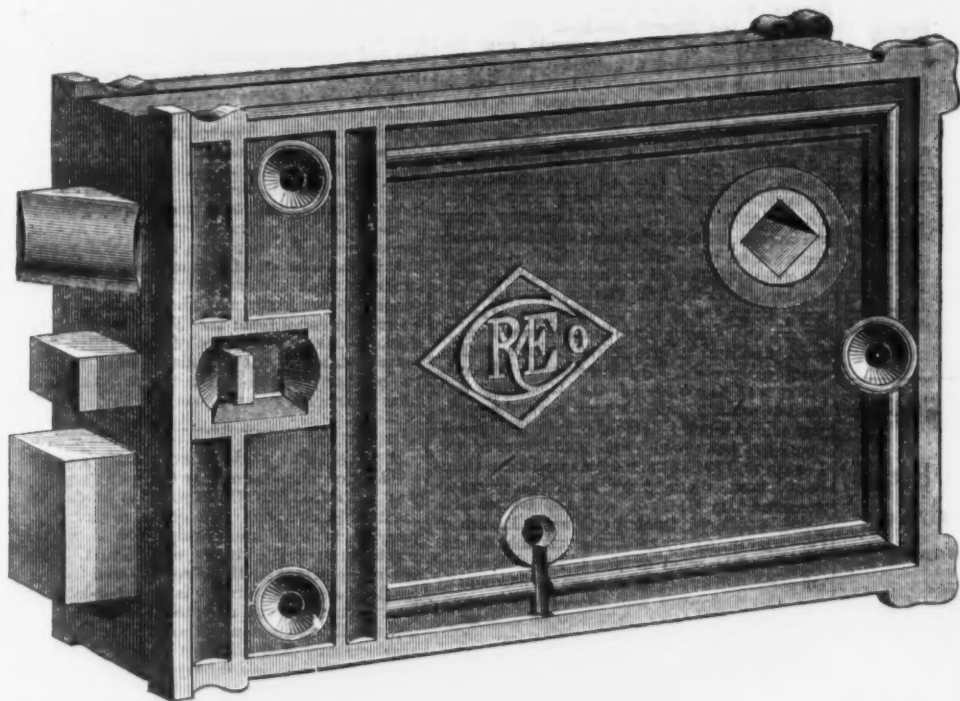
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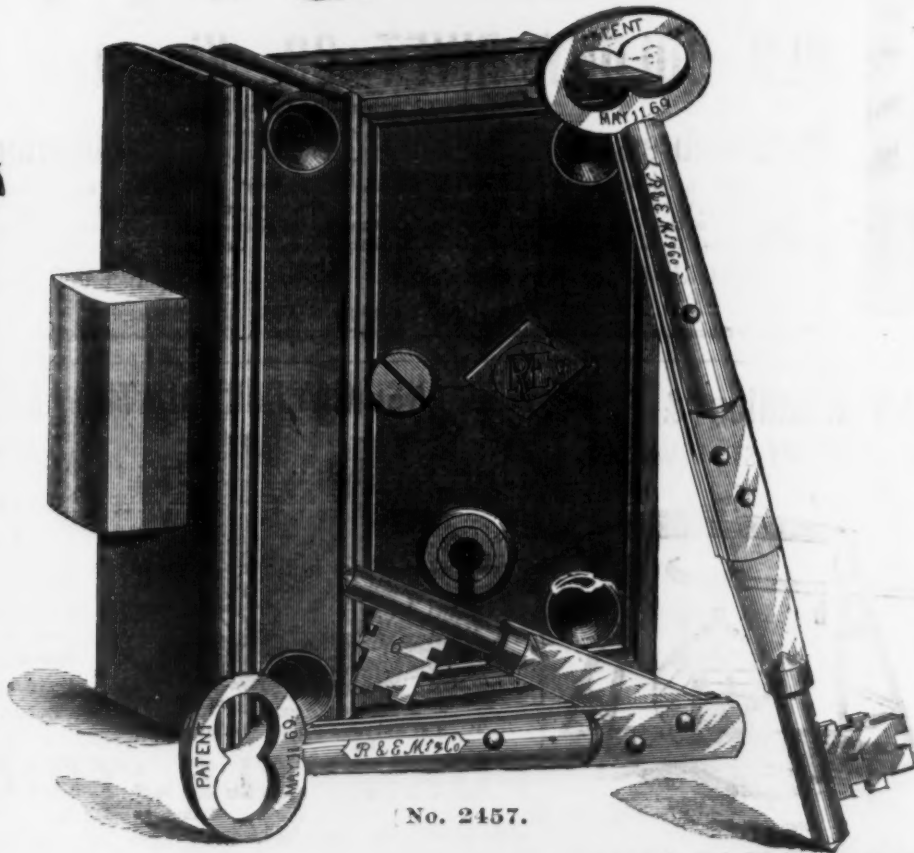
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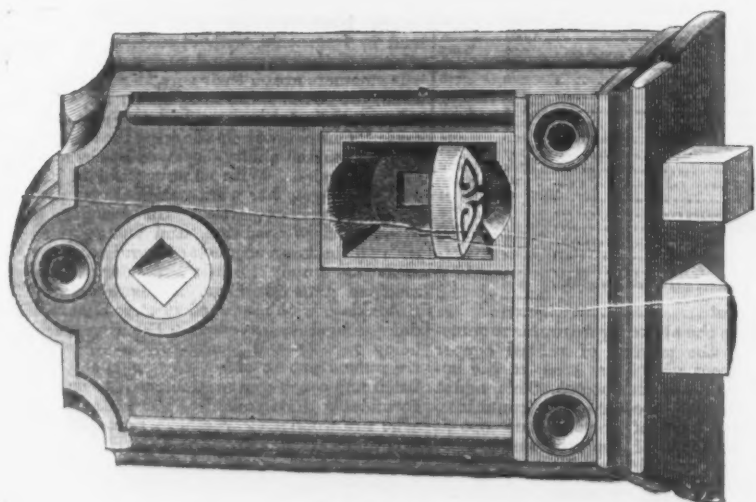
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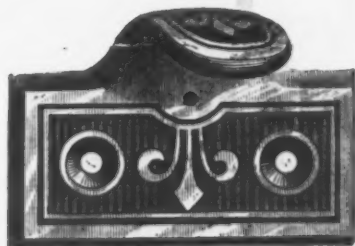
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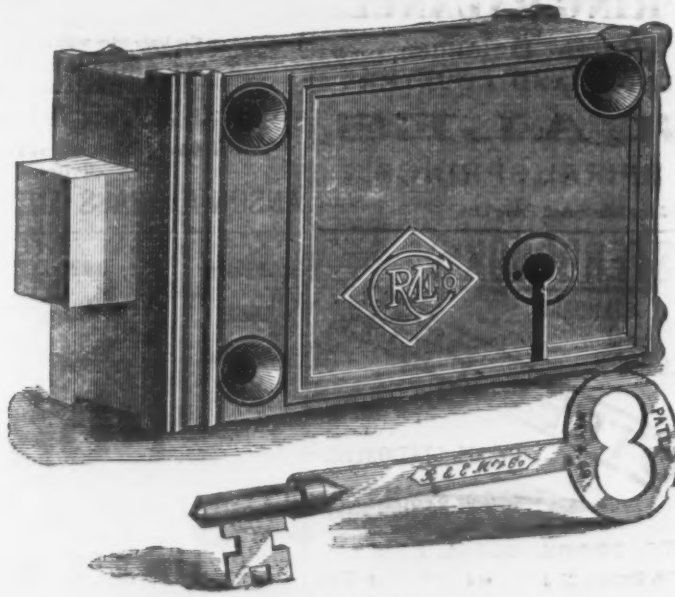
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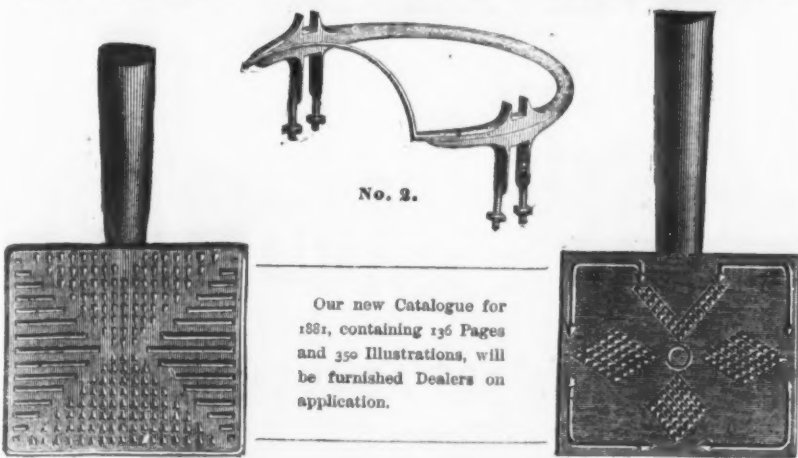


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BIRMINGHAM, CONN.,

Manufacturers of

## CARRIAGE IRON FORGINGS



The "Derby."

COMPRISING

The "Diamond."

FIFTH WHEELS, BODY LOOPS, STAY ENDS, OFFSETS, SLAT IRONS,  
REACH PLATES, JOINT ENDS, STEPS, &c.

WE GUARANTEE OUR GOODS.

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### PORTER MANUFACTURING COMPANY.

MANUFACTURERS OF

PORTER'S PATENT WINDOW & DOOR SCREEN CORNERS ETC.

EVERY ONE HIS OWN WINDOW & DOOR SCREEN MAKER.  
NO MORTISING OR TENONING, CANNOT SAG OR WARP.  
AND ANYONE CAN MAKE THEM. SEND FOR PRICE LIST.

Represented by: CHICAGO, ILL. GRAHAM & HAINES, 113 CHAMBERS ST. W. PICKETT & SON, 164 LEXINGTON ST.

## RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the improved

Hydraulic Jacks

AND

Punches.

Roller Tube Expanders and Direct Acting Steam Hammers.

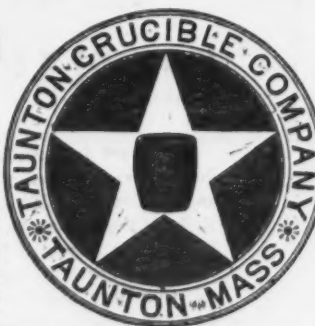
Communications by letter will receive prompt attention.  
Jacks for pressing on Car Wheels or Crank Pins made to order

Our specialty Also, Crestings, Finales and Vases, Stable Fixtures, Hitching Posts, Door and Window Guards  
Wrought-iron Gratings, Fire Escapes and Ladders, Jails, &c. Our Fencing can be shipped to any part of the  
United States, and can be set up by the purchaser at small expense. Our prices are reasonable. Corre-  
spondence and notices of public lotteries of ironwork solicited. Every Hardware Dealer should have our  
catalogue. Address  
CLEVELAND WROUGHT IRON FENCE WORKS,  
Office, 21 Water Street, near Union Depot, CLEVELAND, OHIO.

## PURE CEYLON PLUMBAGO

In Bulk for Polish-  
ing Stoves, &c.

The attention of stove dealers  
and jobbers and stove polish  
manufacturers is called to our  
Pure Ceylon Plumbago, made  
expressly for this trade. Packed  
in 25 and 50 lb. boxes for the  
retail trade, and in barrels for  
the wholesale and jobbing  
trade. Sold under our own  
name, or labeled to order, if  
desired. We guarantee the  
purity of this article, and will  
like back and refund the money  
if any lot that does not give  
satisfaction. Prices and sam-  
ples furnished on application.



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German Silver, Brass and  
Steel.Black Lead Stoppers  
and Nozzles.Jewelers' Crucibles,  
Covers, Dips, &c.

FILE HARDENERS.

All our goods are made of  
the finest Ceylon Plumbago.W. T. MACFARLANE,  
Treasurer and Agent.

## NOVELTY IRON FOUNDRY.

HAIGHT &amp; CLARK, 16 &amp; 18 De Witt St., Albany, N. Y.

Manufacturers of

FINE GRAY IRON CASTINGS OF EVERY DESCRIPTION.

Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano  
Manufacturers. Iron and Metal Patterns of all kinds a Specialty.

Correspondence solicited for all kinds of castings.

## PURE TURKISH EMERY,

Quartz, Pumice and Rotten Stone, Crocus, Rouge, Glue, Sand  
Paper, Emery Paper and Cloth, Emery Wheels, &c.WALPOLE EMERY MILLS,  
Mills, So. Walpole. 114 MILK ST., BOSTON, MASS.

For the information of American manufacturers and agents exporting to Australia and New Zealand, we print the following table  
summarizing the customs duties imposed by Victoria, New South Wales, Queensland, South Australia, Western Australia, New Zealand  
and Tasmania:

	Victoria.	New South Wales.	Queensland.	South Australia.	Western Australia.	New Zealand.	Tasmania.
Agricultural implements.....	20 p. c. av.	free	free	5 per cent.	10 per cent.	free	5 per cent.
Axes.....	free	free	free	10 per cent.	10 per cent.	15 per cent.	free
Antimony ore.....	free	free	5 per cent.	free	10 per cent.	free	free
Anvils.....	free	free	5 per cent.	10 per cent.	10 per cent.	free	10 per cent.
Arms and ammunition, viz.:							
Accoutrements.....	10 & 20 p. c.	free	5 per cent.	10 per cent.	10 per cent.	15 per cent.	Pistols 10 p. c.
Arms and firearms.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Caps.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Cartridges.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Dynamite.....	1d. lb.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Fuse, per coil of 24 feet or less.....	1d. lb.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Gun cotton.....	1d. lb.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Lithofacteur.....	1d. lb.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Powder, sporting.....	1d. lb.	3d. lb.	1d. lb.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Powder, blasting and shot.....	1d. lb.	1d. lb.	1d. lb.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Powder, fine, in 2-lb. cans.....	1d. lb.	1d. lb.	1d. lb.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Bass for brush-making.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Beams and scales.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Bedsteads, iron.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Bells.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Bench screws.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Boilers, land and marine.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Boiler plates.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Bolts and nuts.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Brads, cut.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Brass trunk locks, nails and buckles.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Brass types and type holders.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Brassware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Brushware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Buckles and mountings of silver.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Buttons of ordinary description for making up apparel.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Carriage and cart materials.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Carriage bushes attached to axles.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Castings, metal other than iron.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Castings, iron, builders'.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Chain cables for ships' use.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Chains.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
China and porcelain, per cubic foot.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Clocks.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Combs.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Compositions, piping.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Copperware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Copying presses.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Copper—Bar, rod, sheet.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Ore and ingot.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Scrap and wire.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Cork drawers, wire and steel.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Cotton—Raw waste and wick.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Wicks for lamps.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Criminals' steel.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Crucibles, black lead.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Cutlery.....	11 1/2 cwt.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Engine packing, patent.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Eyelet presses.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Eyelet, brass and white.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Fancy goods and toys.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Felt sheathing for ships' use.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Fenders.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Fire iron.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Fishing materials.....	25 p. c. & free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Forges.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Furnace doors and frames.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Furnace pans.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Galvanized pipes, pipe heads, tubes, guttering, gutter heads and buckets.....	25 per cent.	3/4 cwt.	3/4 cwt.	3/4 cwt.	3/4 cwt.	3/4 cwt.	3/4 cwt.
Galvanized iron cordage.....	free	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Galvanized corrugated iron.....	1/4 cubic ft.	free	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Gas retorts.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Gas stoves.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Gig hames, not plated.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Glass, plate and window.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Glue.....	1d. lb.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Grates.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Grease, anti-friction.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Griddles.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Grindstones.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Hammers, napping, quartz and spalling.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Hardware and ironmongery.....	25 p. c. & free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Harness buckles and mountings for, and gig hames, &c. Hollow ware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Hinges, T.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Hollow ware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Hooks and eyes, ordinary.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Iron, viz. Bar, rod, hoop.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Galvanized.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Lead, in ore, pig and scrap.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Pipes, wrought iron, except welded.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Pipes, cast iron, flanged, spigot and faucet, knees and elbows.....	40/ per ton	free	free	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Plate, scrap and plain sheet.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Wire and wire rope.....	free	20/ ton	20/ ton	20/ ton	20/ ton	20/ ton	20/ ton
Ironware, galvanized.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Ironware, stamped enameled.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Iron, soldering.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Laquered and japanned ware.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Lead, in ore, pig and scrap.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Lead, piping and sheet.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Lead, red and white.....	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Machinery.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Machinery for spinning fibrous materials.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Matches and vestas, for every gross boxes containing 100 matches or under.....	6d.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Metal, Dutch.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Metal, yellow bolts and nuts.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Meters, gas and water.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Military and government stores.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Nails, iron, not for trunks or grindery.....	3/ cwt.	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Nails, horse-shoe.....	12/ cwt.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Needles.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Oils in bulk.....	6d. gal.	6d. gal.	6d. gal.	6d. gal.	6d. gal.	6d. gal.	6d. gal.
Oilman's stores not specified.....	20 per cent.	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Paints ground in oil.....	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton	40/ ton
Paints mixed ready for use.....	20 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Pitch and tar.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Plate, gold.....	3/ per oz.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Plate, silver.....	2/ per oz.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Plated mixed metal ware not specially exempted.....	20 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Printing type.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Quicksilver.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Rails, iron, for tramways.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Railway materials.....	free and 25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Railway iron and steel rails.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Rivets, iron.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Rules, carpenters'.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Saddlery and harness, including whips.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Saddle-trees, riding.....	20/ doz.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Saddle-trees, harness.....	10/ doz.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Saddles, iron.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Scales and beams.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Screws.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sewing machines.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sifts and poles in the rough.....	free	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Skins, iron, rolling and other.....	1d. lb.	5/ cwt.	2/ cwt.	2/6 cwt.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	25 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, sofa, chair and other furniture.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent.	10 per cent.	17 per cent.	10 per cent.
Sofas, iron, rolling and other.....	10 per cent.	free	5 per cent.	10 per cent			



# H. D. SMITH & CO.,

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## BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

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Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

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STEEL BARREL AND CYLINDER.

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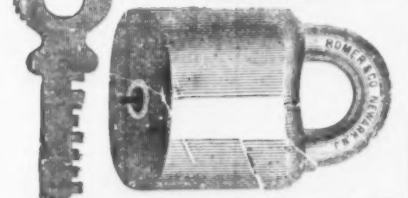
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hang on spout same as tin. To empty the sap tip bucket, as represented.

This spout is not only one of the cheapest, but the strongest and best sap spouts made, and will last a

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Malleable Iron and

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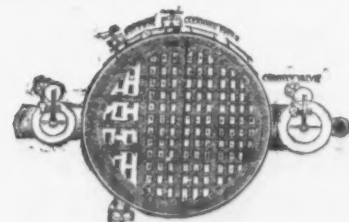
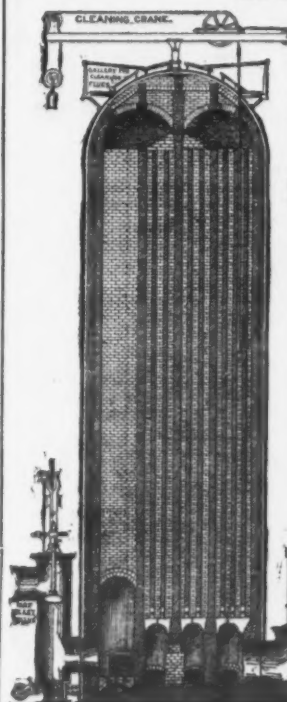
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Contract for erecting the same. Also, for Building and Replacing all types of Blast Furnaces. Combining Economy with Efficiency and Modern Improvements, wherein the output of Furnaces is increased fully 50 per cent, and the fuel consumption decreased in the same ratio.

Our Blast Engines, Hoisting Engines, &c., have no superior in strength of parts, duty or economy. We solicit an opportunity to make proposals on Blast Furnaces, Rolling Mill or Steel Works Machinery.



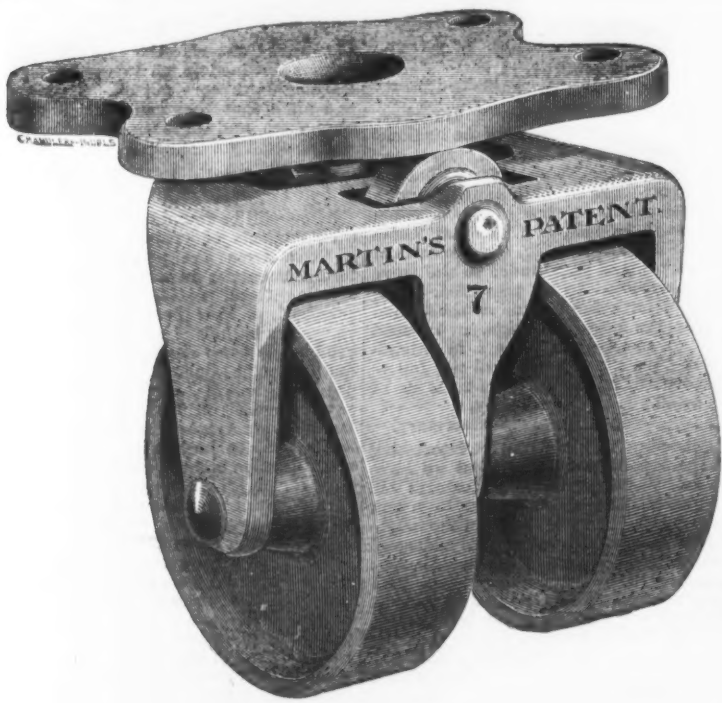
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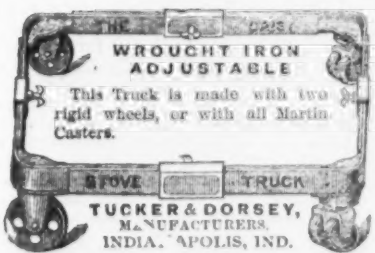
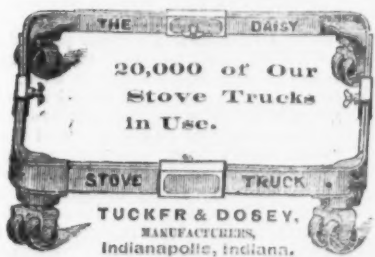
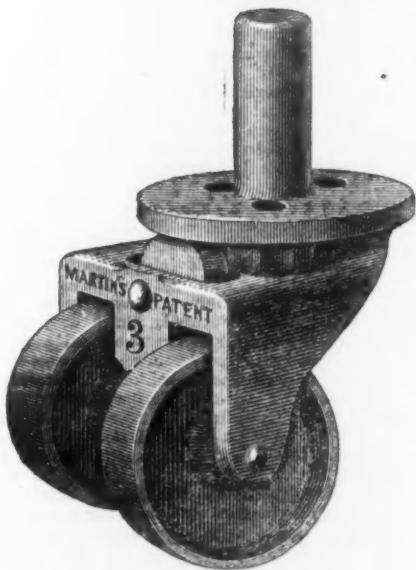
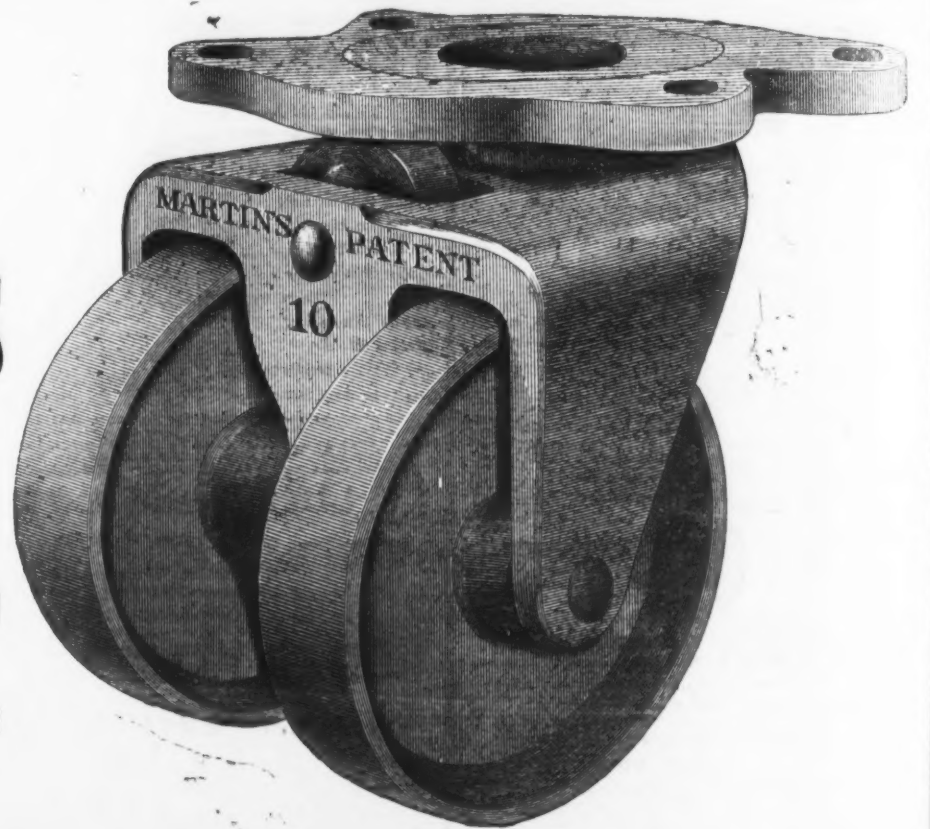




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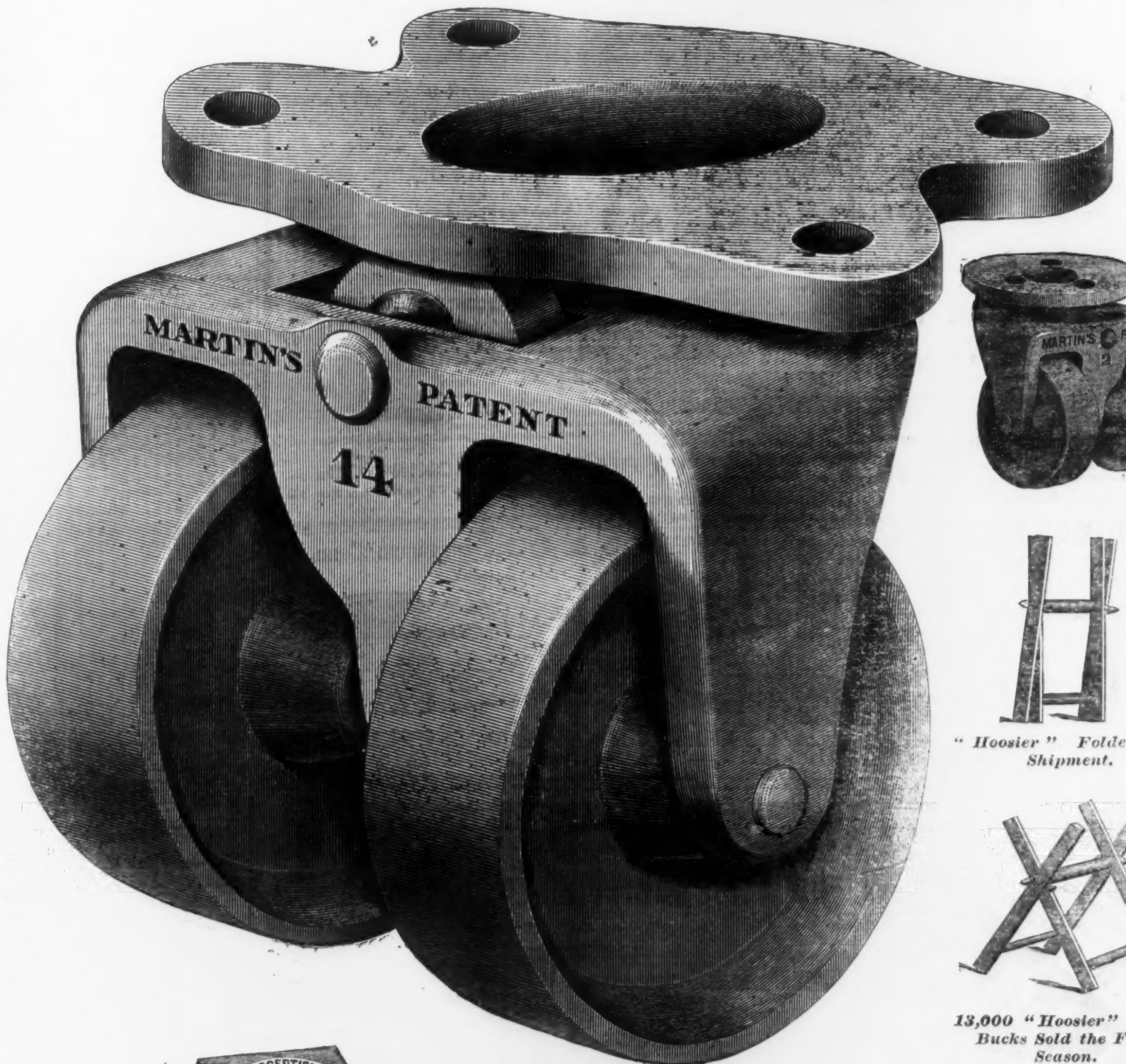
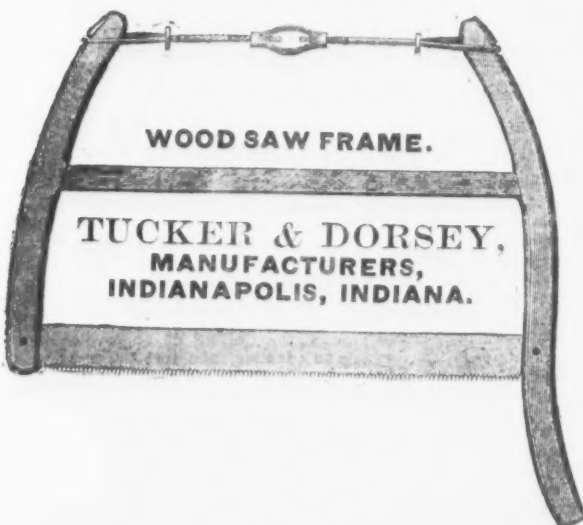
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Please send for Illustrated  
Catalogue.



Observe that we make *Stove Trucks* with either wood or iron frame, also with two rigid wheels, or with all Martin's Patent Casters.

WASHINGTON, OHIO, Jan. 13, 1882.  
We are pleased with our "Daisy" Trucks.  
They are just what we want.  
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"Hoosier" Folded for  
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13,000 "Hoosier" Wood  
Bucks Sold the First  
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ECCENTRIC  
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Over 100,000

TUCKER'S

ALARM TILLS

in use in North America, South  
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With Furniture Dealers these Bracket Casters are growing rapidly in Favor.



We show below a few accounts that will indicate the increased favor with which our Caster is received:

**Bought of Phoenix Caster Co.**

	1879.	1880.	1881.
Simmons Hardware Co., St. Louis.....	\$495 67	\$659 00	\$931 00
Geo. A. Rubleman Hdw. Co., St. Louis..	246 76	709 50	1,019 84
Hilbard, Spencer, Barlow & Co., Chicago.	322 00	589 00	1,319 67
Samuel Cupples & Co., St. Louis.....			352 00
Clemens Vonnegut, Indianapolis, Ind....	124 00	359 00	657 43
Kellogg, Johnson & Bliss, Chicago.....	333 00	569 26	1,158 30
Heaton & Denckla, Philadelphia, Pa....	185 41	130 00	319 60
John Dunn & Son, Baltimore, Md.....		213 00	374 00
J. L. Wayne, Jr., agt., Cincinnati, O....	89 00	321 00	408 00
Glaescher & Co., Cincinnati, Ohio.....	3 60	281 37	514 03
Dunham, Corrigan & Co., San Francisco.	367 00	365 00	654 00
McIntosh, Good & Co., Cleveland, O....	92 00		389 00
Kruse & Bahlman, Cincinnati, O.....	65 00	167 00	321 20
Berkey, Gay & Co., Grand Rapids, Mich..	76 14	169 50	385 47
Nelson, Matter & Co., Gr'd Rapids, Mich.	74 60	240 83	573 00
A. J. Wilkinson & Co., Boston, Mass....	295 81	504 71	707 00
Moore Comb. Desk Co., Indianapolis....	159 72	246 45	212 00
Orr & Lockett, Chicago, Ill.....	153 00	150 00	293 30
Jamney, Brooks & Eastman, Minneapolis.	161 00	106 07	445 68
Phoenix Furn. Co., Grand Rapids, Mich..	49 90	104 43	227 33
Haynes, Spencer & Co., Richmond, Ind..	51 77	287 20	236 00

WM. FRANKFORTH Co., Milwaukee, Wis:  
The No. 12 Martin's Patent Casters are the best we have ever used for moving heavily loaded tables.

PFISTER & VOGEL LEATHER CO.  
Jan. 25, 1882.

CHICAGO, Jan. 24, 1882.  
Messrs. KELLOGG, JOHNSON & BLISS.—  
Gentlemen: We never could handle the large amount of paper run through our press room but for the use of your Martin's Patent Casters; once used, manufacturers will never part with them.

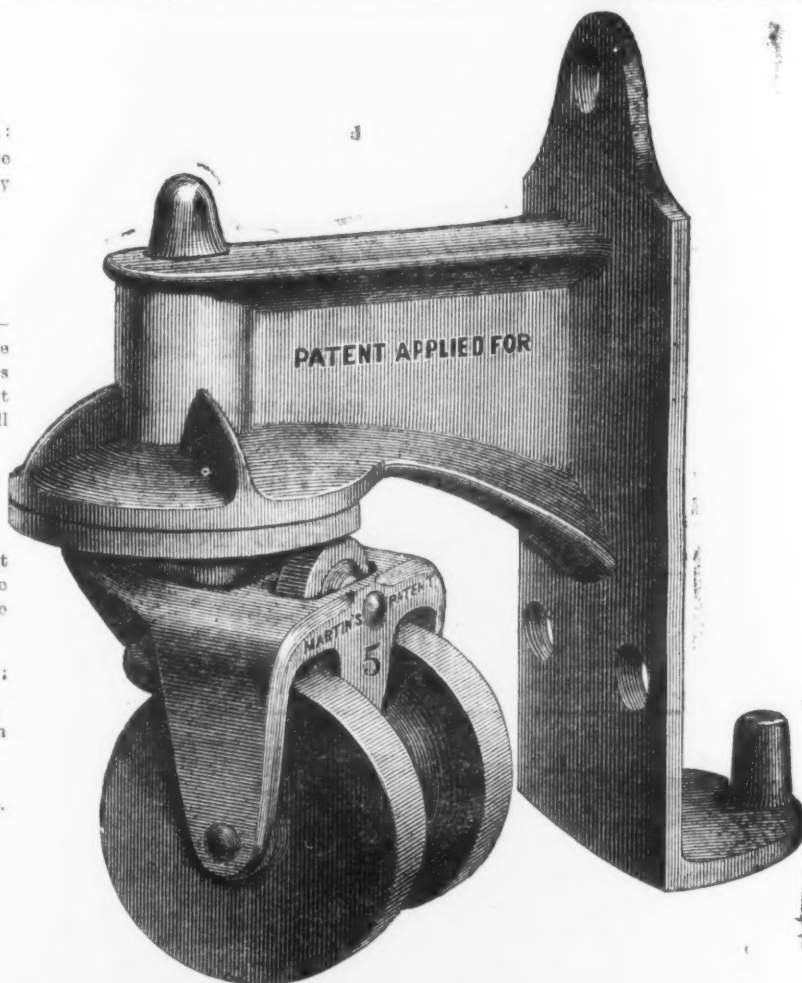
RAND & McNALLY,  
Railroad Printers.

WELLSBURGH, W. VA., Jan. 25, 1882.  
PHOENIX CASTER CO.: Martin's Patent Caster moves full boxes from place to place with more satisfaction than any Caster we have ever used.

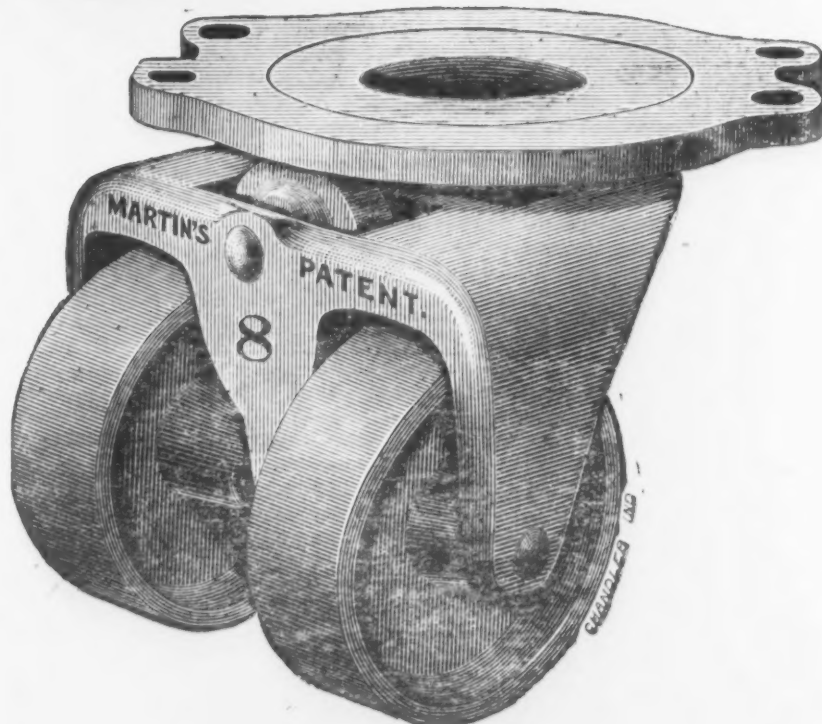
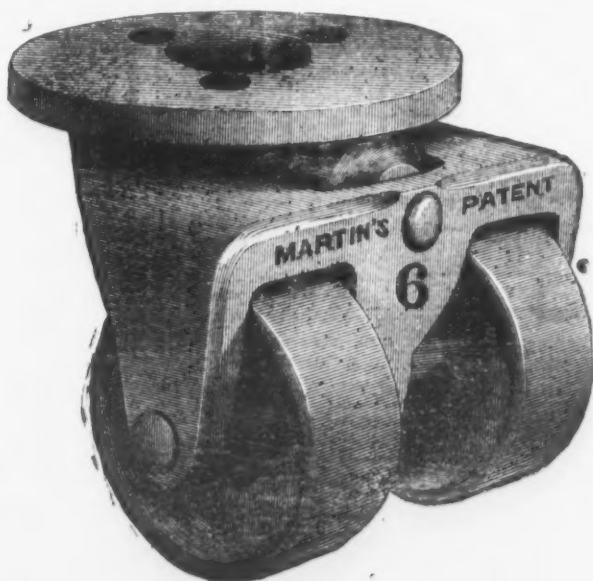
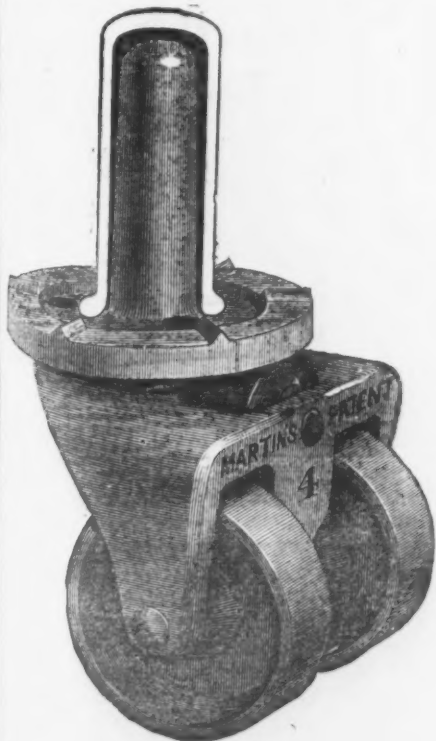
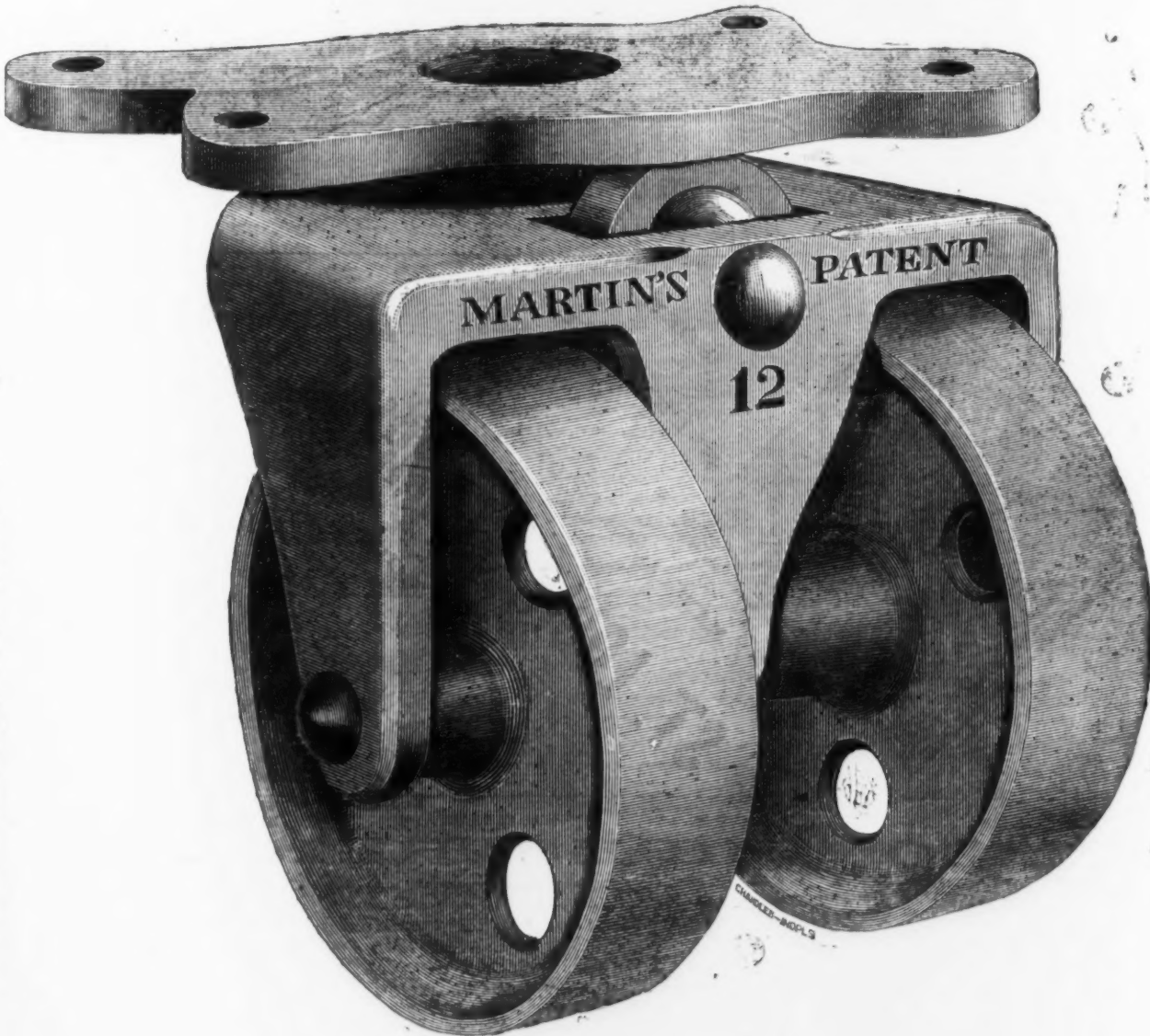
RIVERSIDE GLASS WORKS.

WM. FRANKFORTH & Co., Milwaukee, Wis.  
We have had two years' great satisfaction in the use of Martin's Patent Caster.

VOECHTING, SHAPE & Co.,  
Sole Bottlers for Jas Schlitz Brewing Co.  
Jan. 25, 1882.



With Furniture Dealers these Bracket Casters are growing rapidly in Favor.







PAWTUCKET, R. I.,

MANUFACTURERS OF

# FILES AND RASPS.

ESTABLISHED 1863.

Capacity 1000 dozen per day.

GOODS WARRANTED TO GIVE SATISFACTION.



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

**WHEELER, MADDEN & CLEMSON MFG. CO.,** Middletown, N. Y.

**HARVEY W. PEACE, VULCAN SAW WORKS,** Brooklyn, E. D., N. Y.

Manufacturer of First Quality

**Hand, Panel, and Rip Saws,**

AND KINDRED GOODS.

Also, **MILL, CROSS-CUT AND CIRCULAR SAWS.**

BAND SAWS

A SPECIALTY.



SOLD

EVERYWHERE.

MANUFACTURED ONLY BY

**ST. LOUIS STAMPING CO.,**

ST. LOUIS, MO.

NEW YORK OFFICE, 57 Beekman St.

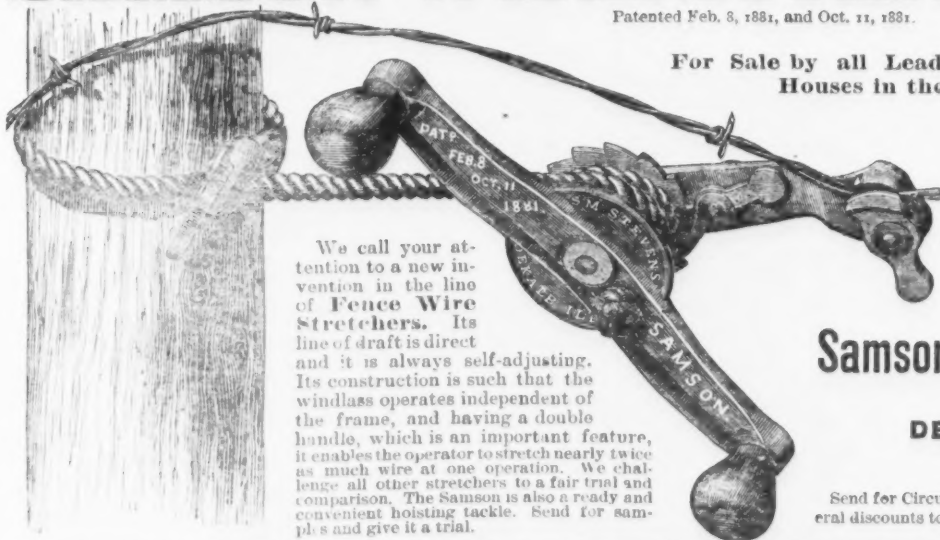
List on Application.

M. D. SHIPMAN. S. M. STEVENS. C. E. BRADT. L. E. SUNDERLAND.

## SAMSON WIRE STRETCHER

Patented Feb. 3, 1881, and Oct. 11, 1881.

For Sale by all Leading Jobbing Hardware Houses in the United States.



MANUFACTURED BY

**Samson Novelty Works,**

DE KALB, ILLS.

Send for Circulars and Price List, showing our liberal discounts to the Wholesale trade.

## JACK SCREWS,

Press Screws, &amp;c.,

Cast with Perfect Seamless Thread by our New Patent Process.

Cheaper than Wrought Iron, not so apt to Bend or Strip the Thread.

LIBERAL DISCOUNT TO THE TRADE.

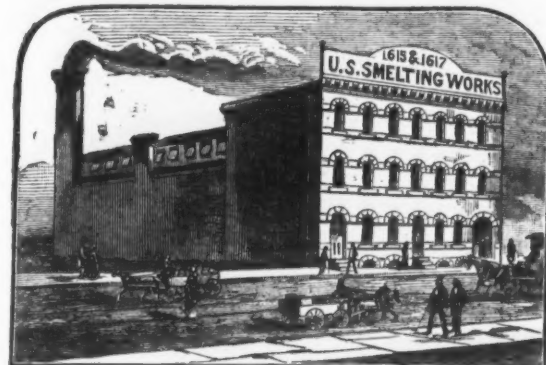
**SEECER MFG. CO.,** Box 1513, Springfield, Mass.

H. E. ASHCRAFT, Agt., 12 Murray St., & 15 Park Place, New York.



## UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



### Babbitt Type and Bolster Metals.

BRASS CASTINGS, CAR BEARINGS and SOLDERS

OF ALL KINDS.

Pig Brass, Bar Tin and Lead, and Spelter.

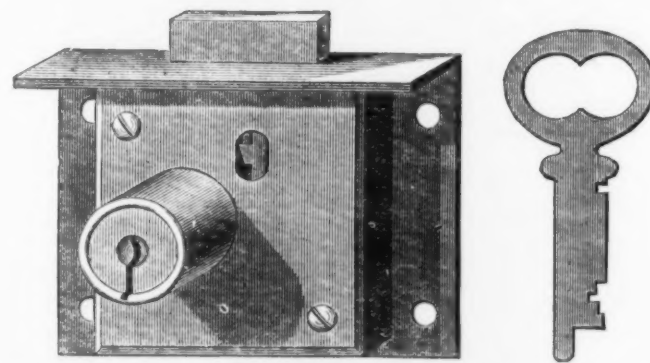
IMPORTERS AND DEALERS IN

**PIG TIN, PIG LEAD, PIG COPPER,**

ANTIMONY, &amp;c.

1615 & 1617 Spring Garden St., - - - PHILADELPHIA.

### TWO NEW LOCKS.



## THE EAGLE LOCK CO.,

TERRYVILLE, CONN.

Have just added two new and valuable patent locks to their already large variety, which will at once commend themselves to the trade.

No. 6101 (Brass) and 6117 (Iron), represented by the above cut, may be locked without using the key, by simply pressing on the plate in the end of the tube. The other patent, Nos. 6201 and 6217, is a lock similar in appearance, but is so constructed that with a small screw driver any dealer can adjust the lock to an endless variety of keys, or make his whole stock "alike" to fit one key, without opening the lock or affecting its security.

These patents have been applied only to drawer and cupboard locks as yet, but will soon be produced in chest and wardrobe locks.

For Sale by Hardware Jobbers Throughout the Country.



C. W. DUNLAP & CO.,  
43 Chambers St., N. Y.,  
Manufacturers of

GARDEN TOOLS  
AND  
Housekeeping Hardware.

## THE AMERICAN MACHINE CO.,

MANUFACTURERS OF

### HARDWARE SPECIALTIES.

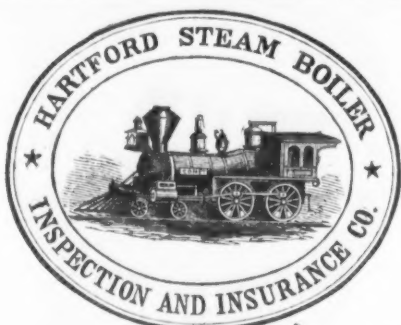
Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 128 Chambers St., New York

SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.









Issues Policies of Insurance after a careful inspection of the Boilers  
COVERING ALL LOSS OR DAMAGE TO

**Boilers, Buildings and Machinery.**

ARISING FROM

**STEAM BOILER EXPLOSIONS.**

The Business of the Company includes all kinds of STEAM BOILERS.  
Full information concerning the plan of the Company's operations can be obtained at the  
**COMPANY'S OFFICE, HARTFORD, CONN.,**  
or at any Agency.

**J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.**

**Board of Directors:**

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**PENFIELD PULLEY BLOCK CO.**  
LOCKPORT, N.Y.

**HENRY B. NEWHALL,**  
105 Chambers Street,  
NEW YORK AGENT.

**S. H. & E. Y. MOORE,**  
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**LONG HANGING EAVE CUTTER.**  
FIFTY-SIX INCHES WITHOUT A SEAM.

7 inch. 7 inch.  
5 inch. 5 inch.  
4 inch. 4 inch.  
Over 150,000 Feet Sold in 1880.

It is made from best quality I. C. Leaded Charcoal Plates formed in half circle and beaded on the side with 5/8 inch round bead, closed down to body of trough, so that it can be soldered as strength may require. Our different sizes measure full across diameter, and we pack in uniform crates or boxes of 25 feet each, ready to be put together in any desired length. We make three sizes, suitable for any building, and can ship promptly on receipt of order. Address,

Lock Box 1427. **ECKEL & CO.,** Richmond, Ind.  
LYON, CONKLYN & CO., Baltimore, Md., Eastern and Southern Agents.  
GIBSON, BAKER & CO., Cincinnati, Ohio.

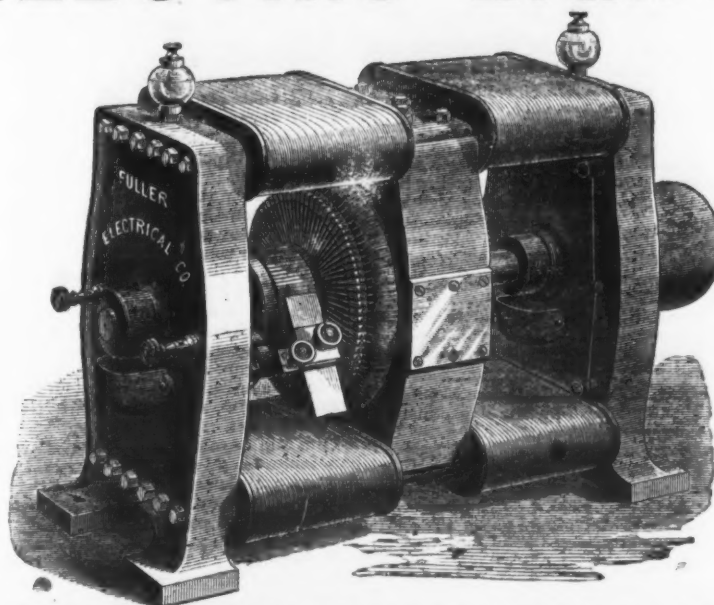
**SANFORD'S PATENT OX SHOE**



Is the only shoe that will not lame an ox, which he can stand up square upon, and will prevent slipping. Six sizes. Liberal discount to dealers. Manufactured by

**SHADBOLT, BOYD & CO., Milwaukee, Wis.**

# ELECTRIC LIGHT.



**THE FULLER ELECTRICAL COMPANY,** having perfected their system of Electric Lighting, are prepared to furnish the Improved Gramme Dynamo Electric Machines and Electric Lamps, either for single lights or for from 2 to 20 lights in one circuit. This apparatus is unexcelled for durability, steadiness of light and economy of power, and requires less attention than any other. For price list and further particulars apply to

**THE FULLER ELECTRICAL COMPANY,**  
44 East Fourteenth Street, NEW YORK.

THOMPSON McCOSH, Pres.

ROBERT DONAHUE, Treas.



**PHILADELPHIA SCREW CO., Limited,**  
Twelfth and Buttonwood Streets, PHILADELPHIA.

Manufacturers of

**IRON & BRASS WOOD SCREWS.**

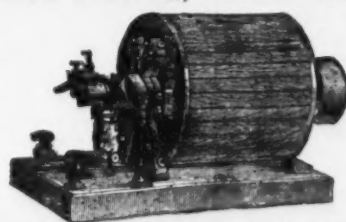
Quality, finish and tests as to strength guaranteed equal to any in the market.  
With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

**The American Dynamo-Electric Machine,**  
For Electro-Plating, Electrotyping, &c.

Requires no Water.

Combining

all the



Latest

Improvements.

Cannot Reverse

Current.

**THE ZUCKER & LEVETT CHEMICAL CO., Gen. Agents,**  
Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.  
510, 512, 514 & 516 WEST 16TH STREET, N. Y.



**Cuyahoga Falls, Ohio.**

**Tinned Belt Rivets**  
AND  
**Burrs a Specialty.**

EASTERN AGENTS,  
Alford, Ward, Davenport & Co.,  
85 Chambers St., New York.

**V. G. HUNDLEY,** PROPRIETOR OF  
**NORTH CAROLINA HANDLE CO.,**



MANUFACTURER OF  
**Handles and Spokes,**  
79 Reade Street and 97 Chambers Street, NEW YORK.  
HARDWARE COMMISSION MERCHANT.

## STATEMENT

SHOWING THE NUMBER OF  
**HILL'S TRIANGULAR HOG RINGS**  
Sold to the Jobbing Trade in the Cities and States named, from Dec. 1, 1880, to Dec. 1, 1881.

San Francisco.. 170,400	Omaha..... 54,000
California.. 170,400	Nebraska.. 54,000
Alton..... 7,200	New Brunswick.. 14,400
Bloomington..... 32,400	New Jersey.. 14,400
Chicago..... 3,974,400	Auburn..... 14,400
Danville..... 18,000	Buffalo..... 14,400
Detroit..... 410,400	Elmira..... 105,600
Jacksonville..... 31,200	New York City.. 52,000
Pekin..... 45,600	Poughkeepsie .. 28,800
Peoria..... 14,400	Syracuse..... 43,600
Quincy..... 108,000	Rochester..... 31,200
Rock Island.. 105,600	Utica..... 5,000
Springfield.. 89,400	
Illinois..... 5,350,200	New York..... 295,900
Franklin..... 14,400	Cincinnati..... 961,000
Ft. Wayne..... 43,200	Cleveland..... 201,200
Indianapolis.. 645,600	Columbus..... 196,800
La Fayette..... 195,600	Dayton..... 98,400
Richmond..... 14,400	Delaware..... 14,400
Terre Haute.. 39,400	Gallopols..... 9,600
Indiana..... 945,600	Hillsboro..... 15,800
Burlington..... 158,400	Sandusky..... 2,400
Cedar Rapids.. 14,400	Springfield..... 2,400
Davenport..... 223,200	Toledo..... 127,800
Des Moines..... 187,200	Washington C.H. 72,000
Dubuque..... 72,000	Zanesville..... 63,600
Ft. Dodge..... 28,800	
Keokuk..... 30,400	Ohio..... 1,871,200
McGregor..... 7,200	Portland..... 36,000
Ottumwa..... 28,800	Oregon..... 36,000
Iowa..... 775,400	Allegheny City.. 14,400
Atchison..... 122,400	Philadelphia..... 343,200
Leavenworth.. 18,000	Pittsburgh..... 21,600
	Reading..... 19,200
Kansas..... 140,400	Penna..... 398,400
Louisville..... 190,800	Knoxville..... 62,400
Maysville..... 33,600	Nashville..... 4,800
Kentucky..... 224,400	Tennessee..... 67,200
Baltimore..... 396,000	Lynchburg..... 14,400
Maryland..... 396,000	Richmond..... 13,200
Detroit..... 189,600	Virginia..... 27,600
Michigan..... 189,600	Wheeling..... 234,000
St. Paul..... 18,000	W. Virginia..... 234,000
Winona..... 9,600	Fond du Lac..... 6,000
Minnesota..... 27,600	La Crosse..... 14,400
Kansas City.. 201,600	Milwaukee..... 385,200
St. Joseph..... 273,600	Wisconsin..... 405,600
St. Louis..... 1,224,800	
Sedalia..... 28,800	
Springfield.. 14,400	
Missouri..... 1,743,200	
	<b>Total 13,362,100</b>

100,000,000 of HILL'S Tri-  
angular Hog  
Rings have been sold in nine  
years, consuming 550,000 pounds  
of wire, measuring 2400 miles.  
For sale by Hardware Dealers  
everywhere.

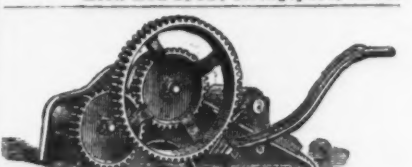
**H. W. HILL & CO.,**  
Decatur, Ill.

H. W. HILL. C. P. HOSUM.



**THE GIANT PAD LOCK.**  
Manufactured by  
**THE SMITH & EGGE MFG. CO.**  
(Centennial Award.)

"Superior in Every Respect."  
This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made-of the best material-very hard-some in appearance, and every Lock is warranted. Orders solicited. Address as above.



**Quick Adjustable Tire Bender.**  
The best and cheapest arrangement for bending tires in the market. Simple in construction, adjust-  
able to any size or diameter tire. Price, \$10.00  
No. 1 bends any tire up to 4 1/2 in. wide. Price, 12.00  
No. 2 bends any tire up to 6 in. wide. Price, 12.00



**IMPROVED AUTOMATIC TIRE AND AXLE SETTER.**  
The most perfect machine for upsetting or shrink-  
ing wagon tires, axles, braces, &c., ever placed in the  
market. Every blacksmith should have one. They  
are cheaper than any other machine, and one man  
operates it alone. Liberal discount to the trade and  
agents. Send for circulars and discount. Corre-  
spondence with jobbers solicited.  
No. 1 upsets any tire up to 3 in. wide x 5 1/2. Price, \$10.00  
No. 2 upsets any tire up to 4 in. wide x 6. Price, 12.00  
For sale by RUSSELL & ERWIN MFG. CO., 45 Cham-  
bers St., New York, and E. C. FROMBLY & CO., Platts-  
burgh, N. Y. (P. O. Box 310), Mfrs. and Proprietors.

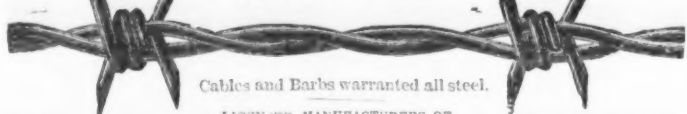
**GEO. M. EDDY & CO.,**  
Manufacturers of  
**Measuring Tapes**  
Of Cotton, Linen & Steel.  
ALL PURPOSES.  
351 to 353 Classon Ave. Brooklyn, N.Y.

**Print Your Own** Cards, Labels,  
Presses, &c.  
LARGER SIZE.  
8 1/2 x 11 other sizes. For business,  
pleasure, old or young. Every-  
thing easy by printed instructions.  
Send two stamps for Catalogue of  
Presses, Type, Cards, &c., to the  
factory.  
KELLEY & CO., Meriden, Ct.



## THE CINCINNATI BARBED WIRE FENCE CO.

JAS. LARSON, Pres't. OFFICE AND FACTORY, 52, 54, 56, 58 &amp; 60 New Street, CINCINNATI, O. C. W. COLE, Sec'y



Cables and Barbs warranted all steel.

## FOUR-FOUNDED BARBED WIRE FENCING.

We have large stock of Galvanized, Red and Brown Painted Barbed Wire on hand, and can fill all orders promptly. Send for sample and prices.

## RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

## Horse, Mule &amp; Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CALPENTER, President

C. H. PERKINS, Gen'l Manager.

B. W. COMSTOCK, Secretary

Gentlemen.—This cut illustrates our

## CAST IRON

## Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania. We call your attention to and solicit your order for them, confidently asserting that they are an A No. 1 article in every respect.



Sample sent if desired.  
PRICE, \$12 PER DOZEN.

Taylor &amp; Boggis, CLEVELAND, O.

## BUCKEYE LAWN MOWER.

THE "BUCKEYE" JUNIOR LAWN MOWER

MANUFACTURED BY MAST FOOS & CO. SPRINGFIELD, O.

SENIOR AND JUNIOR "BUCKEYE" LAWN MOWERS.

Most Reliable, Compact, EASY WORKING, Durable and Efficient Mower in the Market.

Send for descriptive circular.

## AGENTS:

EVERETT & SMALL, Boston, Mass.  
H. B. NEWHALL, New York, N. Y.  
CHAS. H. GEORGE & CO., Providence, R. I.  
LOEHLER & LADD, Buffalo, N. Y.  
J. M. CHILDS & CO., Utica, N. Y.  
DUFF & McKEAN, Pittsburgh, Pa.  
MCINTOSH, GOOD & CO., Cleveland, Ohio.  
ROGERS, ENGLISH & CO., Dayton, Ohio.  
BRINTNALL, LAMB & CO., Chicago, Ill.  
BLACK & OWEN, Detroit, Mich.  
PRESIDENT, BROS. & CO., Fort Wayne, Ind.  
VALEN & NEW, Indianapolis, Ind.

Correspondence solicited, and full information, with circulars, furnished on application to

## MAST, FOOS &amp; CO., Springfield, Ohio, U. S. A.

ATTENTION.—Three tools combined. AN ANVIL, the face of which is chilled, hardened and polished. A PARALLEL VISE, with four-inch steel face jaws, which open six inches. A FOLDABLE VISE that will hold wedge shaped articles.



For discounts address  
CHENEY ANVIL & VISE CO., - - - Detroit, Mich.

## THE SHRODER DOOR SPRING

The BEST DOOR SPRING in the MARKET.

It will hold a door open as well as shut, and by its peculiar form has four inches more leverage to hold a door shut, closing it tight, where all other Springs fail. No latch required with this Spring.

DELONG & SHRODER, Manufacturers,  
Warren, Illinois.

Correspondence solicited with jobbers and large dealers. We will send a full-size Spring or a small model free, on application. Try it.

## INDUSTRIAL ITEMS.

## MAINE.

On Goose River, East Belfast, the most extensive business carried on is the manufacture of axes. D. Kelley & Co.'s factory is the largest, the yearly production being 3000 dozen. The company now employ thirteen men and run four trip hammers. George Hardy's factory makes about three dozen axes daily. Thomson & Sherman's factory is a new building, and the annual product is about 3000 dozen.—*Boston Commercial Bulletin*

## MASSACHUSETTS.

A new shaft for iron ore has been opened on the Mason farm, Cheshire, by the Jagger Iron Company, of Albany. The shaft is 30 feet deep, and from it extend twelve drifts from 50 to 250 feet, the prospect for a good yield being excellent.

The Whitcomb Lawn Mower Company, at Chicopee Falls, will soon move their works to Newburgh, N. Y., and the mower will hereafter be made on a royalty by the Excelsior Lawn Mower Company.

Rogers & Sheldon, whose water supply has been cut off from their factory at East Bridgewater by the city of Brockton, propose to build a new rolling mill near the depot in East Bridgewater, for rolling plates for nails. About \$50,000 will be laid out in making the improvements.

A fire broke out on the 24th ult., in the pattern room of the Rodney machine shop, Athol, which, with its contents, was destroyed; also a lumber shop belonging to the Gold Medal Sewing Machine Company, containing 160,000 feet of lumber. The total loss is from \$75,000 to \$100,000, on which there is only a partial insurance. One hundred hands are thrown out of employment, beside losing their tools. A defective chimney was the cause of the fire.

## RHODE ISLAND.

The Valley Falls Iron Foundry began operations on Wednesday of last week, when iron was melted for the first time in the town of Cumberland since Woonsocket was set off as a town by itself. This is the second foundry that has found birth in this fast-growing village. It is situated near the Rhode Island Horse Shoe Works.

The Franklin Foundry and Machine Company, of Providence, have just shipped the last of the order of 65 Foss & Pevey cards for the Merchants' Manufacturing Company, Montreal, Canada.

## PENNSYLVANIA.

The Bridesburg Manufacturing Company's splendid exhibit at the Atlanta Exhibition has already borne good fruit. Orders for more than \$100,000 worth of cotton machinery have already been received from the South, and negotiations are in progress for nearly the same amount for Eastern manufacturers. The company have now about six hundred and fifty men employed, and, if they could secure tools, would be able to give full employment to 1000 hands.

Stokes & Parrish, Thirtieth and Chestnut streets, Philadelphia, have recently taken an order for a complete furnace outfit, for the La Belle Iron Company's 60-foot furnace at Birmingham, Ala. They have also taken an order for a slope hoist, 8 x 9, for the Montgomery Furnace, at Port Kennedy, and one for Hetters's Furnace, at Spring Mills.

Sidebottom & Powell, Frankford Boiler Works, Frankford, have recently enlarged their works by the addition of a new boiler shop, 80 x 42, and made other improvements and additions, among which the following may be mentioned: A pair of shears and punches, built at Manchester, England; 40-ton crane and a new boiler house and boiler. They also propose to enlarge the machine shop.

Clem & Morse, 413 Cherry street, Philadelphia, have just finished and shipped by the Morgan Line of steamers a new passenger elevator, for a dry-goods store recently built at Canal and Magazine streets, New Orleans. The elevator is plain, but extremely neat and substantial. A short time ago they shipped a freight elevator to the same store, and do quite a large business through their agent. Both the above will be worked by gas engines.

Work on the Lyman-Haskell multi-charge cannon at the Scott Iron Works, Reading, is being prosecuted day and night. In the machine shop of these works the men now work until 11 o'clock every night. The establishment is full of orders, and the expectation is that the place will be worked day and night after next month.

Work has commenced on four new puddling furnaces to be added to the Wheeler Iron Company's rolling mill. The squeezers are to be moved, an addition is to be built to the building and another train of rolls put in. This work, when once under full headway, will necessitate a stoppage of a few weeks. Additions are also being made to the chain department, and after all is completed it will employ from 75 to 100 more operatives.

The barb-wire works at Beaver Falls ship from four to five car loads of barbed fence wire every day, and are about sixty cars behind orders.

The new rolling mill at Pine Iron Works is fast being completed. The buildings are up, and the machinery is being put in piece by piece. From present indications, it will be ready to begin its work of making iron plates in about four or six weeks. The buildings are of frame, and stand on a high piece of ground on the road to Pottstown. The mill will furnish work for about 60 hands.

The furnaces of the Dunbar Furnace Company are making nearly one thousand tons of metal per week.

Some twenty-five stone masons are at work in laying the foundation walls for a new addition to the Reading Iron Works in Reading. It will be used as a machine shop, blacksmith shop and also for the manufacture of sockets for the pipes that are made in the tube works. A new engine of about 150 horse-power and boiler with new machinery of the latest improved kind will be placed in the building, and it will be fitted up throughout in first-class style. After its completion the old machine shop at the tube works will be abandoned. Other important improvements will be made.

The Fairchance Furnace is being improved by the addition of a Durham hot-blast.

The old Oliphant Furnace, owned by the Fayette Coke and Furnace Company, was fired up last Tuesday.

## PITTSBURGH AND VICINITY.

It is reported that the Superior Iron Works are to be started up by the Eastern stockholders.

The sale of the personal property of the Siemens-Anderson Company being over, the parties at interest are now enabled to proceed to business. For more than a week past several capitalists, who represent the New York syndicate, have been visiting here, and yesterday they, after a consultation with the creditors, made a formal proposition to the M. & M. bank and other creditors. The exact nature of the proposition is not known, but it is believed it will be satisfactory, and if it is then the mills will be started at once. As the bank and the New Yorkers have bought enough of the mill property to run the mill it will be started without trouble. The interests of all parties necessitate the running of the mill. The customers in nearly every case will renew their orders and wait for several days for the mills to begin work. This announcement is on the authority of the gentlemen themselves. The aggregate of the sales is about \$170,000.

There has been considerable trouble in the firm of A. J. Nelles & Co., steel manufacturers, of this city, in consequence of which an injunction has been asked, dissolving the partnership.

## WEST VIRGINIA.

There are now nine self-feeders in operation at the Riverside Factory, and others are being put in as fast as they can be obtained. It is said, however, on pretty good authority, that they do not give entire satisfaction.

## OHIO.

But few persons in this city, aside from the proprietors and employees of mills, have any definite idea of the number of puddling furnaces operated in this city, and the amount of muck bar produced every twenty-four hours during six of the seven days in the week. A News reporter visited the several mills, and received the following figures from the proprietors as to the number of furnaces each had in operation:

Youngstown Rolling Mill Company, ..... 21  
Andrews Bros. & Co., ..... 21  
Artwright, McCurdy & Co., ..... 3  
Mahoning Valley Iron Company, ..... 15  
Brown, Bonnell & Co., ..... 125

Total number ..... 264  
Each of these furnaces will a two tons of muck bar every twenty-four hours amounting to 528 tons per day, or 3168 tons every six days. Substantially the whole amount is converted into merchant iron. These figures give some idea of the standing this city has in the iron world.—*Youngstown News*.

Brown, Bonnell & Co., Youngstown, have bought the Struthers Furnace, their two furnaces, Phoenix and Falcon, being unable to supply pig as fast as wanted. The Struthers is regarded as one of the finest furnaces in the valley. The price paid has not transpired.

The Bellaire Nail Works' cash dividends for the past year have amounted to \$115,000. Besides this a number of very substantial buildings have been put up—a large brick warehouse and a brick stable, a brick bluing house and the foundation above high-water mark for a power house. There have been quite a number of new nail machines put in, and to keep pace with them, an addition is being built for four more boiling furnaces, while a new furnace and battery of boilers has been put in.

## KENTUCKY.

The repairs at Ashland Furnace having been completed, the furnace resumed operations last Friday. Everything is working well; the furnace is getting back to her daily average of between 60 and 70 tons.

All departments of the Norton Iron Works are in full blast and working finely. The nail mills made last week 4085 kegs of nails, and shipped during the same time 6200 kegs. The furnace is working well, making a daily average of over 50 tons of good iron.

## ILLINOIS.

Some of the stone for the foundation of the Chicago Locomotive Works, at Garfield, has arrived, and other material has been shipped. The company will shortly advertise for bids for the construction of their buildings, machinery, &c., and hope before many months to be letting out locomotives.

The Willard Sons & Bell Company, of South Chicago, started up two new Willard patent steam hammers in their works this week, and as soon as completed will add two more to their works.

Recent dispatches state that a boiler in the nail mill of the Belleville Nail Company exploded last Monday, almost totally destroying the building and killing several men. The damage is placed at \$20,000.

## INDIANA.

Owing to the falling in of one of the furnaces of the Dewap Glass Works, New Albany, they will have to run their plate department on half time for some months, which will largely decrease their production.

## MISSOURI.

We clip the following from the *Age of Steel*: C. Hager & Son, South Second street, employ about 50 men in the manufacture of hinges. The Conrad Seibel Copper and Sheet Iron Works are turning out a large lot of soda-water apparatus. The Harrison Wire Co.'s galvanizing department has again been enlarged. Recently they turned out 28,000 pounds of galvanized wire in 24 hours. Electric lights have just been put in operation in the East St. Louis Grain Elevator. This is said to be the first grain elevator ever illuminated by electricity in the United States.

## MICHIGAN.

A vague rumor is afloat that somebody is going to put in another blast furnace in the vicinity of Florence. The location is an excellent one, and we would not be surprised to see several more concerns of the kind in operation in that neighborhood within a couple of years.—*Mining Journal*.

It is stated that the last opposition to the Thomas-Gilchrist patents in Germany has again been defeated in the Berlin courts.

## Gold and Silver Production.

Wells, Fargo & Co.'s annual statement of precious metals produced in the States and Territories west of the Missouri River, including British Columbia (and receipts in San Francisco by express from the west coast of Mexico) during 1881, shows aggregate products as follows: Gold, \$31,860,686; silver, \$15,077,829; lead, \$6,361,902; copper, \$1,105,000; total gross result, \$54,504,417. California shows a decrease in gold of \$579,069, and an increase in silver of \$31,184,057, the yield from the Comstock being only \$1,726,162, as against \$5,312,592 in 1880—a decrease of \$3,586,430. The product of Eureka district is \$4,127,265, as against \$4,639,025 in 1880—a decrease of \$511,760. Utah shows an increase of \$860,335. Colorado shows an increase of \$1,672,171, and Arizona \$3,726,295 over the report of last year. The gross yield for 1881, shown above, segregated, is approximately as follows:

Metals.	Per cent.	Value.
Gold.....	37.71	\$31,860,686
Silver.....	27.35	15,077,829
Lead.....	7.73	6,361,902
Copper.....	1.41	1,105,000
Total.....		\$54,504,417

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1870-1881.

Year.	Lead.	Copper.	Silver.	Gold.
1870.....	1,000,000	1,000,000	1,000,000	1,000,000
1871.....	1,000,000	1,000,000	1,000,000	1,000,000
1872.....	1,000,000	1,000,000	1,000,000	1,000,000
1873.....	1,000,000	1,000,000	1,000,000	1,000,000
1874.....	1,000,000	1,000,000	1,000,000	1,000,000
1875.....	1,000,000	1,000,000	1,000,000	1,000,000
1876.....	1,000,000	1,000,000	1,000,000	1,000,000
1877.....	1,000,000	1,000,000	1,000,000	1,000,000
1878.....	1,000,000	1,000,000	1,000,000	1,000,000
1879.....	1,000,000	1,000,000	1,000,000	1,000,000
1880.....	1,000,000	1,000,000	1,000,000	1,000,000
1881.....	1,000,000	1,000,000	1,000,000	1,000,000

Products as per Wells, Fargo & Co.'s statements, including an amount from British Columbia and west coast of Mexico.

Year.	Lead.	Copper.	Silver.	Gold.
1870.....	1,000,000	1,000,000	1,000,000	1,000,000
1871.....	1,000,000	1,000,000	1,000,000	1,000,000
1872.....	1,000,000	1,000,000	1,000,000	1,000,000
1873.....	1,000,000	1,000,000	1,000,000	1,000,000
1874.....	1,000,000	1,000,000	1,000,000	1,000,000
1875.....	1,000,000	1,000,000	1,000,000	1,000,000
1876.....	1,000,000	1,000,000	1,000,000	1,000,000
1877.....	1,000,000	1,000,000	1,000,000	1,000,000
1878.....	1,000,000	1,000,000	1,000,000	1,000,000
1879.....	1,000,000	1,000,000	1,000,000	1,000,000
1880.....	1,000,000	1,000,000	1,000,000	1,000,000
1881.....	1,000,000	1,000,000	1,000,000	1,000,000

The exports of silver during the present year to Japan, China, India, the Straits, &c., have been as follows: From Southampton, \$21,000,000; from Marseilles, \$1,000,000; San Francisco, \$5,000,000; total, \$27,000,000, as against \$34,700,000 from the same places in 1880.

A singular equity case has just been decided by Judge Benedict in the United States Circuit Court for the Eastern District of New York. The defendant is the owner of a patent which the complainant is charged with infringing. The complainant declares that the patent is void for want of novelty, and if he were sued for an infringement he would defend on that ground. His chief witness to sustain his defense is a very old man, and he avers that the owner of the patent is awaiting the death of the old man before bringing the suit. Therefore, that he may not be deprived of the benefit of this testimony the infringer of the patent himself files his bill in equity under section 866 of the United States Revised Statutes, to have the testimony of this witness recorded in perpetuum rei memoriam. Then, if after the death of the old man the owner of the patent brings his suit, this testimony can be used in the defense. The proceeding was a novel one, no bill for the recording of testimony in this manner in a patent suit being recorded in the books. The defendant demurred to the bill, and Judge Benedict has overruled the demurrer.

A process for coating all kinds of metal and their alloys with thin films of copper has been perfected by M. F. Weil, who recently exhibited several specimens of his craft at the French Academy of Sciences. The coating is done instantaneously by a single copper bath at the ordinary temperature. The adherent film, which is formed of sub-oxides of copper, not yet studied, is often of the most beautiful colors. Steel, brass, or the precious metals can thus be covered with a film of any required tint at the will of the operator, and the variety of tints is that displayed by the phenomenon known as the "colors of thin plates." Either a single color or all the hues of iridescence can be produced from the same bath, according to the way in which the pieces are exposed to the electric action. These colors are, however, in opinion of M. Weil, not due to the well known effect of thin plates, but to the sub-oxides of copper, and he supports his opinion by the experimental fact that a piece of any metal whatever, polychromized by his process, is immediately covered with a layer of pure copper of the richest red when treated by nascent hydrogen. The argument evidently is that the coating is in the latter case no thicker, but the color is completely changed.

The Emigration Commissioners, whose funds are nearly exhausted, have resolved to ask the Legislature of this State for authority to contract with the Atlantic steamship companies, by accepting their proposition to pay 50 cents per capita for each emigrant landed for the next five years.

The newly consolidated railroad lines, to be known as the Lehigh and Hudson, connecting the latter point with Belvidere, on the Delaware River, will ship to market an immense tonnage of ore from different points along its route.



# The Iron Age

Metallurgical Review.

New York, Thursday, February 2, 1882.

DAVID WILLIAMS, Publisher and Proprietor.  
JAMES C. RAYLES, Editor.  
JOHN S. KING, Business Manager.

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Commercial England has taken a "cold chill" over the appearance in the Thames of a Chinese steamer, manned by Chinese and carrying Chinese merchandise, the first of a line between Shanghai and London. This line proposes to take some of the profits of this trade which have heretofore been largely taken by English merchants. The English are raising the same cry that has been raised in this country, that the Chinese are coming to take the bread out of their mouths. The Springfield *Republican* very pertinently asks: "But if England and America did not want 'China and Japan in their way, why did they

"compel these nations to open their ports and enter into relations with them? If the Western nations get more than they asked for, what right have they to complain?"

## The Legal Aspects of the Stamped Ware Combination.

It would be an interesting and profitable inquiry for one versed in the law and familiar with decisions of the courts, to inquire whether the Stamped Ware Manufacturers' Association, in the exercise of its assumed right to control the trade of both manufacturers and dealers, is an unlawful conspiracy, rendering the conspirators amenable to indictment. We do not claim a measure of legal knowledge entitling our opinion on this point to recognition as authoritative, but the results of inquiry have set us thinking and may be found to furnish food for profitable thought for those directly interested. Let us say at the outset that we are not in any way injured or affected by the combination of stamped ware manufacturers, and that we are able to consider the legal aspects of their position without prejudice and solely as a question of general trade interest.

As is well known to most of our readers, the Stamped Ware Manufacturers' Association comprises the principal manufacturers of stamped tinware in the United States. It was organized in January, 1881. Its object is to prevent, if possible, a competition among manufacturers which was considered ruinous, and to insure to those in the business a fair remuneration for the time, labor and capital employed in the business. In its plan of organization it is not unlike other trade associations, but to strengthen its position and enforce its assumed authority, very unusual and extreme measures were adopted. It was agreed that the association should fix prices and issue a price list known as the "manual list," from which no member of the association should deviate except to the extent of the discounts permitted by the association. To such persons dealing in stamped tinware as the executive committee may choose to consider jobbers, an additional rebate of 10 per cent. is allowed, on the certificate of the Actuary, provided such jobber will solemnly obligate himself by contract not to sell for less than the prices fixed by the association. Members of the association are permitted to exchange manual goods at jobber's rates, by reporting the same to the Actuary. Manufacturers are eligible to membership on the payment of an initiation fee of \$1000. The several members are given a rating based on the capacity of their works and the amount of their sales, and are required to file monthly with the Actuary a statement of all manual goods delivered by them during the previous month, and each member of the association is entitled to claim of the total deliveries such a proportion as his rating warrants. When any member is found to have sold in excess of the amount he is entitled to sell, the Actuary is to assess him 10 per cent. on the amount of such excess, and pay over the sum thus collected to the other members who may have sold less than their allowance, each receiving a share proportionate to his rating. This is practically a pooling arrangement, designed to discourage a larger production or a greater distribution on the part of a member than the allowance based on his rating. The reports of the members are required to be sworn to, the prescribed oath giving no chance for misrepresentation, evasion or reservation without perjury. A bookkeeper's oath is also deemed necessary to support the sworn statement of a member. The jobber carrying manual goods is required to sign an agreement not to sell at less prices than those fixed by the association, and must affirm his fidelity to his agreement under an iron-clad oath whenever the Actuary may require him to do so. A member accused or suspected of violating, or permitting to be violated, the rules of the association respecting prices, is to be arraigned by the Actuary and furnished with a copy of the complaint. Within three days he must name an arbitrator acceptable to the Actuary, who shall name another, and these two shall choose a third. The board thus constituted is to hear and decide the case, the agreement of two being necessary to a decision. Expulsion from membership is the penalty for violation of the rules. We do not know just what rules govern the reinstatement of penitent delinquents, but from what we know of cases in which such reinstatement has been effected, the pecuniary damages demanded and paid were heavy.

That the manufacturers of stamped ware have a perfect right to organize an association and agree upon a price list, no one will question. But it is perfectly evident that to control each other they must undertake to control jobbers and wholesale dealers, and we question whether the means adopted to this end do not make the officers and members of the association conspirators under the meaning of the law. From a little book, entitled, "Rules of the Stamped Ware Manufacturers' Association of the United States," copies of which have reached us from several sources, we quote as follows:

If any member of this association has knowledge that any dealer in manual goods is selling them at lower prices than those fixed by the association, he shall at once report the fact to the Actuary, with such proofs as he may be able to furnish, and thereupon the Executive Committee shall carefully investigate all such reports, and if they be satisfactorily verified, then the Actuary shall forthwith notify the members of the association not to sell manual goods to such dealer. And thereafter no member of the association shall, either directly or indirectly, sell manual

goods to any dealer thus reported by the Actuary. The right of again dealing with any such offending individual, firm or corporation can only be acquired by a majority vote of the Executive Committee.

As showing how this rule works in regard to dealers, we have had lately put into our hands letters which show that the members of the association have conspired to deprive certain dealers of the power to conduct their business successfully, by denying them the opportunity to buy certain classes of goods which they need for their trade. We have a letter addressed to a house prominently engaged in the business, and signed by representatives of two firms in the membership of the association. It reads as follows:

Jan. 17, 1882.  
Messrs. —: In accordance with the request of the Stamped Ware Association of the United States, we beg to inform you that after this date we cannot furnish you with any goods whatever.  
We remain, yours respectfully,

Another letter of notification has been handed to us, which reads thus:

New York, January 23, 1882.  
To Messrs. —: Gentlemen: What shall we do with your order of the 19th inst.? The actuary has notified us and all members of the association that we must not sell goods of any description to —.

(Signed.)  
The houses mentioned in the above letters are all leading concerns, and their names are suppressed for obvious reasons. That this is a conspiracy is evident without discussion. Whether it is an unlawful conspiracy depends upon what the law is and what it requires.

Combinations among men engaged in the same business or trade, for the purpose of enhancing the price of an article manufactured by them, or raising their wages, or increasing the profits of their business, are not uncommon. These combinations are usually formed by articles of agreement between the parties, providing that certain articles of trade shall be sold at prices specified in the contract, and prescribing a penalty—usually a forfeiture of a certain amount of money—to be paid by any of the parties who shall sell the article for less than the prices settled by the association. The object of this inquiry is to discover whether such a contract is valid and binding upon the parties, and whether it renders them liable to a criminal prosecution.

No case, that we are aware of, has ever been brought before the present Court of Appeals of New York, in which it was necessary for the court to pass upon a contract of the kind we have spoken of. There are several decisions, however, made before the organization of the Court of Appeals, and in the time of its predecessor, the Court of Errors, which pass upon the question of the validity of these contracts. The decisions were made by the Supreme Court, as it was then. Should a contract of the kind under discussion be brought before any one of our courts now, the principle settled by these cases would undoubtedly be of great weight, and would probably prove decisive. The most important of the cases referred to are *Hooker vs. Vandewater*, 4 Denio, 349; and *Stanton vs. Allen*, 5 Denio, 434.

In the first of these cases the proprietors of five lines of transportation on the Erie and Oswego canals, in this State, combined for the ostensible object, as was set forth in their agreement, of establishing fair and uniform rates of freight, and equalizing the business among the parties. The real object, however, as was shown by the evidence, was to raise the rates of freight on these canals. An agent was appointed to manage the affairs of the association, prices of freight were settled, and a penalty provided to be visited upon any party who should transport freight at lower rates than those prescribed by the association. The agreement also provided that at certain intervals the profits should be equalized among the members. The plaintiff and defendant were members of the combination. The plaintiff sued to recover a balance due to him from the defendant under the provisions of the agreement. The defendant set up the defense that the contract was void under the provision of the Revised Statutes against conspiracy. This provision reads as follows: "If two or more persons shall conspire to commit any act injurious to trade or commerce, they shall be deemed guilty of a misdemeanor." The court held that the plaintiff could not recover, because the contract was void, providing, as it did, for the performance of an act injurious to trade, and therefore forbidden by the above law. Had information been filed against the members of the combination by a shipper whose business was injured by the advance in freights, we can see no reason why they would not be indictable under the law.

Another case of which we find record in the same authority, involved much the same general conditions, and was decided on the same grounds. The principle upon which these cases were based was, that whatever destroys or slackens competition and rivalry in business is necessarily injurious to trade; that it is injurious by increasing the price of an article without a corresponding increase in value; that it, in fact, decreases the value of the article manufactured or dealt in, the manufacturer or dealer not being incited to bestow skill and attention upon his business, and being relieved from fear of loss through the want of them, protected, as he is, by the articles of association, which name the price but do not fix the quality of the article.

So far as New York State is concerned,

we cannot see why any jobber or dealer suffering direct and demonstrable pecuniary injury from a conspiracy to deprive him of a supply of stamped ware of standard makes and patterns, has not a right to complain, or why it is not a proper matter for investigation by the Grand Jury. If it be conceded that such an association as that of the Stamped Ware Association is a conspiracy, the question of the amenability of its members to indictment is, we think, easily answered, for the statute itself declares that the parties to a conspiracy "shall be deemed guilty of a misdemeanor," an offense punishable by the laws of this State with a fine of \$250, or less, or imprisonment in the county jail for a term not exceeding one year, or both. Consequently the members of such a combination as we have described are indictable upon the complaint of any person to the grand jury. The criminal side of the cases has been very rarely brought to the notice of the courts of this State, and it is somewhat remarkable that in nearly every case the conspiracies, the parties to which have been indicted, were combinations among workmen for the purpose of raising their wages. To put the question at rest in this State in reference to trades unions, the Legislature passed a law in 1870 excepting them from the operation of the Conspiracy Act, declaring that it shall not be construed to prohibit the peaceable assembling or co-operation of persons employed in any profession or trade for the purpose of maintaining or securing an advance in their wages. Similar statutes have been passed in England. So that combinations among workmen cannot now be held conspiracies so long as their acts keep within proper bounds; but they must not threaten employers, or prevent others from working, or endeavor to force them to work for the wages prescribed by the regulations of their association. But the law still applies to business men and manufacturers, although an exception has been made in the case of wage-earners—a necessary exception, as their amenability to the law against conspiracy, as it stands, would lead to great oppression of workmen in the hands of rich and unscrupulous capitalists. Other laws are sufficient for the protection of employers' rights and property.

In the State of Pennsylvania the law of conspiracy is very clearly defined by statute and by decisions of the courts. We quote as follows from "Brightly's Purden's Digest of the Laws of Pennsylvania," pp. 350 and 351: "If any two or more persons shall falsely and maliciously conspire and agree (c) to cheat and defraud any person or body corporate of his or their moneys, goods, chattels or other property, or to do any other dishonest, malicious and unlawful act, to the prejudice of another (d), they shall be guilty of a misdemeanor, and on conviction be sentenced to pay a fine not exceeding \$500 and to undergo an imprisonment by separate or solitary confinement at labor, or by simple imprisonment, not exceeding two years."

185.—It shall be lawful for any laborer or laborers, workman or workmen, journeyman or journeymen, acting either as individuals or as the member of any club, society or association to refuse to work or labor for any person or persons, whenever, in his, her or their opinion the wages paid are insufficient or the treatment of such laborer or laborers, workman or workmen, journeyman or journeymen by his, her or their employer is brutal or offensive, or the continued labor by such laborer or laborers, workman or workmen, journeyman or journeymen, would be contrary to the rules, regulations or by-laws of any club, society or organization to which he, she or they may belong without subjecting any person or persons so refusing to work or labor to prosecution or indictment for conspiracy under the criminal laws of this Commonwealth. Provided—That the act shall not be held to apply to the member or members of any club, society or organization, the constitution, by-laws, rules and regulations of which are not in strict conformity to the Constitution of the United States. Provided—That nothing herein contained shall prevent the prosecution and punishment under existing laws of any person or persons who shall in any way hinder persons who desire to labor for their employers from so doing or other persons from being employed as laborers.

NOTES.  
The conspiracy of itself is a distinct crime though nothing has been done in pursuance of it. *Commonwealth vs. McGowan*, 2 Pars., 341. *Commonwealth vs. Curren*, 16 Pitts., L. J., 73.

But to justify a conviction there must be proof of an unlawful combination between the defendant and one other person. *Commonwealth vs. Irwin*, 28 Leg. Int., 349.

All confederacies wrongfully to prejudice another of misdemeanors at common law, whether the intention be to injure the property, person or character of the prosecution. *Commonwealth vs. Curren*, 16 Pitts., L. J., 73.

So a conspiracy may be to injure public trade, to affect public health, to insult public justice or to do anything in itself illegal. *Commonwealth vs. Curren*, 16 Pitts., L. J., 73.

In his charge to the jury in the case of the *Commonwealth vs. Haines, Miskey & Clement*, delivered Feb. 5, 1881, Judge Finletter, defines conspiracy as follows:

There is nothing in the law of conspiracy which need for a moment confuse an attentive juror. It is an agreement to do an unlawful thing, or to do a lawful thing in an unlawful manner. In either case the essential and controlling element is the combination or agreement of the parties. Without this there can be no conspiracy, no matter how criminal the acts may be. If the thing to be done be lawful, then the means used must be unlawful. If, however, it be unlawful, then it matters not how innocent the means may be. So that, in brief, wherever there is combination with unlawful means or unlawful purposes, there is conspiracy.

Again, he says:

To aid us we have certain well-defined principles.

1. Every act is presumed to be lawful and intended until the contrary is shown.

2. Every one is presumed to have intended the natural result of his act.

3. Every injurious act is wrongful and unlawful.

4. When two or more persons engage in an unlawful act or purpose, the law presumes that they intended to act together, and that they agreed or combined together to do it, and that the act of one is the act of both.

Further on Judge Finletter says:

All combinations to increase or depress the price of labor, to increase the cost of anything

bought and sold or bartered, is a criminal conspiracy. Therefore it is that combinations by employers to prevent any one from obtaining labor—shutting out, as it is called; combinations by workmen to prevent others from working; combinations to raise the price of freights or fares; combinations to raise or depress the price of stocks; combinations to raise the price of wheat or drugs or anything else, are criminal conspiracies. Such conspiracies are of the most dangerous character. Their evil results are widespread. They affect whole communities, while the ordinary conspiracy to cheat and defraud affect individuals only.

We have neither time nor space to pursue further our inquiry into the legal aspects of the position of the Stamped Ware Association in relation to the trade. We think what we have already gathered without any skill in legal search, will show that their rules and the methods adopted for their enforcement place the officers and members of the association, and of other associations having similar aims and objects, in a position of open violation of the laws of two States. No doubt this would be true of every State in which they do business. It may be said that dealers would gain nothing by proceeding against the members of the association, inasmuch as each member would have an undoubted right to refuse to sell him goods on his own account. This is an error. Concerted action with regard to prices and the boycotting of dealers is rendered possible only by conspiracy within the meaning of the law. If this conspiracy were broken up by the enforcement of the penalties imposed by the law the trade would be regulated by natural laws, and not by the *ipse dixit* of an actuary or an executive committee. We have no reason to suggest that any boycotted dealer should take this course, but the question of whether he can do so if he will is one in which a great many of our readers are likely to feel an interest.

A. L. Holley.

The simple announcement, "Holley is dead," which passed from one to another on Monday morning, was more eloquent of sorrow, more significant of irreparable loss to those who knew him, than anything we can write. Though not wholly unexpected, his death was nevertheless a shock. Such a calamity is one for which there can be no preparation. The more we fear it and the longer we regard it as imminent, the keener the sense of grief when it comes. Holley was the most lovable man we have ever known. Earnest, honest, unselfish, he was a man to look up to and to lean upon. His kindly counsel was never asked in vain, his help was never refused when sought, his promise was as sacred as a devotion upon an altar. Holley as the engineer is not now in our thought; it is of Holley the friend, the delightful companion, the master wit, the sympathetic, considerate, tender-hearted, pure-minded, gentle-natured man, of whom we write. We have done what we could elsewhere to pay such poor tribute to his great worth to the world and the profession as the time and space at our command have permitted, and have offered this with his portrait, skillfully engraved, but lacking, as a portrait must, that in his bright and intellectual face which seemed to reflect his real self. The last few years, and especially the last few months of his life, wrought great changes in his appearance, but he retained to his last conscious moment the characteristics of mind and heart which had made him from youth a prince among men. And how characteristic his death! Leaving England that his wife might be spared the anxiety and care of what he thought would be his last illness, and wishing earnestly that if he could not know and speak to his loved ones, his death before they came might spare them the agony of seeing him die without recognizing them; the many things he said and did which his friends will delight to remember, make his last hours a glorious triumph of unselfish love over every weakness of human nature. Had it been possible he would have wished for ten or fifteen years more of life to round and complete his professional career; but there was no repining, and he even questioned the propriety of his physician's efforts to avert the inevitable result, unless there was other and better reason for them than a desire to keep the flickering flame from going out. Tears shed for such a man are no evidence of weakness. The world will go on and another will take up the work he has left unfinished; but Holley's place in the hearts of his friends will never be filled.

## Tolls on the State Canals.

State Engineer Seymour makes an able argument, in his annual report for 1881, in favor of free canals. He shows that the canals can compete with railroads in the transportation of many articles demanded by mechanics and manufacturers, and that in the interests of labor it is not safe to give up facilities because they are not needed now. Rival routes are using every means to get control of our domestic commerce, both by way of the Welland and St. Lawrence Canals and via the Mississippi River. The Secretary of the Merchants' Exchange, St. Louis, states that upon the opening of navigation in the month of March, 1881, and for some time thereafter, the through rate from St. Louis to Liverpool was as high as 26 1/2 cents per bushel on wheat, while the rate by rail via New York, and thence by steamer to Liverpool, was about 35 cents. He says, however, that since the first rush ended, freights have gradually declined until on the



31st of May the rate from St. Louis to Liverpool via the Mississippi River was only 13½ cents per bushel on wheat, whereas at the same time, by the rail route via Atlantic seaports, it was about 30 cents per bushel, a difference of 11½ cents per bushel in favor of the river route.

Trade in consequence has been largely deflected to the Mississippi, and we cannot depend upon the railroads to maintain the commercial supremacy of New York. Even if it is true that the rival routes can carry the Western produce to tidewater for less than it can be done by the lake and canal route, this is not the controlling consideration. The great question is, Which can carry for the least price to the best market? Engineer Seymour contends that New York City has the advantage in being able to meet the demands both of the foreign and domestic trade. "The greatest market for 'various reasons is,' he says, 'always the best market, although it may cost more to reach it than other commercial points.' He represents, further, that all the commercial, manufacturing, mechanical and agricultural interests of the State are now endangered by efforts made in other quarters to turn away transportation from the State of New York, and that New York should not stop with the improvement of her water routes, but make the canals absolutely free. Some of his statements it will be difficult to controvert.

#### The Prospect of Tariff Legislation.

Judging from the tone of the Washington special of the past few days, the tariff discussion in the House of Representatives is not far off, and when it opens it promises to be a broad and earnest one. While there seems to be no doubt that if the question was put to a vote in the House, "Resolved, that we favor a protective tariff," quite a majority would vote for it, yet when it came to the practical question, "What in the case of each article in the list would be a protective duty?" there would instantly be a diversity of views—so great a diversity, indeed, that it would be doubtful if the majority could be maintained. If, for example, the question should arise as to the duty on steel rails, there would be a wide diversity of views, ranging from the free list to the present rates or higher.

It is uncertain at the present time over what bill the discussion will arise, but it may be taken for granted that it will be over the McKinley bill or the Tariff Commission Bill. Of the McKinley bill it may be said that its real effect is only to interpret the tariff laws in accordance with what not only protectionists, but even free traders, have confessed is their true intent and meaning. But while this is so and the bill is evidently just, there is a question whether it is better to try and urge its passage at this time. While the Ways and Means Committee (with the exception of Randall, who was absent, and Messrs. Morrison, Tucker and Carlisle) agreed to report it on Monday next, the friends of the measure are hesitating lest the cause be injured and the chances of the Tariff Commission Bill be endangered. No attempt could safely be made to pass it under a suspension of the rule requiring two-thirds of the House, and if reported it will go on the calendar, and, when called up, to the Committee of the Whole, where the utmost freedom of debate is allowed, and where the friends of the measure could only succeed by force of numbers, voting down every proposition offered by its enemies. Some of the members of the Ways and Means Committee are of opinion that the protectionists had better bear the ills they have, customs decisions and all, than to launch forth on the uncertain sea of legislation in advance of a systematic scheme of revision, devised either by the Ways and Means or a tariff commission. It is reported that delay in presenting the McKinley bill to the House is not to enable Morrison to prepare his minority report, but to allow time for consultation among the Republican members of the House, called for the purpose of considering the advisability of the proposition to try and force it through at this time. It is believed, however, that the bill can be passed.

In the meantime, the chances for the passage of the Tariff Commission Bill are growing less. It is no secret that several Republican Senators, among them Mr. Sherman, are not favorable to it, and it is also well known that several of the members of the Ways and Means Committee only favor it because their constituents ask it, and not because their judgment approves it. The statement of the President to the members of the Committee of the New York Tariff Convention, which was virtually hostile to the commission, though an attempt has been made to explain it away, has also injured the prospects of the commission, and it is now doubtful if the bill can pass. Take it all in all, especially if the Tariff Commission Bill fails in the Senate, it would not surprise us to see the Ways and Means Committee settle down to the work of making a new tariff bill or readjusting the present one.

The system in vogue in Georgia, of farming out the convicts of that State in chain gangs, bids fair to be made an issue in the coming political campaign in that State. The facts brought out in a recent investigation are a disgrace to civilization, and the abolition of the system would be abundant reason for the existence of a party.

## THE IRON AND STEEL CENSUS.

Summary of the 1880 Statistics, Compiled by James M. Swank, Special Agent.

In the following table is presented a summary of the more important results established by the census of 1880, compared with similar results established by the census of 1870:

United States.	Total in 1870.	Total in 1880.	Percentage of increase in 1880.
Number of establishments.....	1,005	808	24.38
Am't of capital (real & personal) invested.....	\$230,971,884	\$421,772,074	80.68
Value of all materials used.....	\$101,271,150	\$235,526,139	41.13
Value of all products made.....	\$296,557,685	\$607,208,695	43.12
Weight of all products (tons).....	7,265,140	13,655,215	98.76
Total hands employed.....	140,978	77,555	81.78
Total am't in p'd in w'gs.....	\$55,476,385	\$40,514,081	36.93

**ESTABLISHMENTS.**  
The whole number of establishments that were engaged in the manufacture of iron and steel in 1880, or were built or partly built to engage in their manufacture, was 808. In 1870 it was 1,005. The increase in the ten years was 24.38 per cent. By the term "establishment" is meant a single manufacturing enterprise, or an aggregation of enterprises of like character under one management. Thus one establishment may embrace two rolling mills, and another may embrace four blast furnaces. If, however, a firm or company operates two or more enterprises of different character, each of these enterprises is classed as a separate establishment. A comparison of the number of the various establishments in 1870 and 1880 is given below:

	1870.	1880.
Blast furnace establishments.....	385	470
Rolling mill establishments.....	319	394
Steel works.....	30	73
Forges and bloomeries.....	82	118
Total.....	808	1,005

The size and capacity of the establishments were much greater in 1880 than in 1870. As the capacity of blast furnaces only was given in 1870, no complete data are available for a comparison of the capacity of all the works in the two periods. The daily capacity of the blast furnaces in 1870 was 8,357 tons of pig iron, and in 1880 it was 19,248 tons, an increase of 130.32 per cent. The number of blast furnaces in 1870 was 385, and in 1880 it was 470, an increase of 22.08 per cent.

The following exhibit shows the number and capacity of the blast furnaces, rolling mills, steel works, forges and bloomeries at the close of the census year 1880:

Blast furnace establishments.....	470
Completed blast furnaces.....	461
Rolling mill establishments.....	394
Rolling mills, each double furnace counting as two furnaces.....	4,319
Rotary puddling furnaces (Sellers).....	1
Dunk puddling furnaces.....	10
Hammers in iron rolling mills.....	19
Heating furnaces.....	1,205
Trains of rolls in iron rolling mills.....	1,206
Nail machines.....	2,775
Steel works.....	73
Bessemer steel converters.....	29
Open-hearth steel furnaces.....	37
Pot holes for crucible steel.....	2,691
Trains of rolls in steel works.....	136
Hammers in steel works.....	118
Forges and bloomeries.....	118
Forge and bloomery fires.....	495
Siemens rotator.....	1
Hammers in forges and bloomeries.....	141
Daily capacity of blast furnaces, in tons.....	19,248
Daily capacity of iron rolling mills, in tons.....	16,430
Daily capacity of Bessemer steel converters, in tons.....	4,467
Daily capacity of open-hearth steel furnaces, in tons.....	837
Daily capacity of Bessemer and open-hearth steel rolling mills, in tons.....	5,323
Daily capacity of crucible steel works, in tons.....	445
Daily capacity of forges and bloomeries, in tons.....	520

**CAPITAL.**  
The whole amount of capital invested in 1880 in the iron and steel industries of the United States which are embraced in this report was \$421,772,074; in 1870 it was \$230,971,884; increase, \$190,800,190, or 82.6 per cent. Of the whole amount invested in 1880 Pennsylvania's share was 46 per cent.; that of Ohio was 11 per cent.; that of New York was 9 per cent.; and that of Missouri and New Jersey was each 4 per cent. No one of the other States shows an investment greater than 3 per cent.

**TOTAL PRODUCTION.**  
The total production of the iron and steel works of the United States in 1880 was 7,265,140 tons; in 1870 it was 3,655,215 tons; increase, 3,609,925 tons, or 98.76 per cent. The phrase "total production" includes the products of all the various processes or operations, although in ascertaining most of these products there is a necessary duplication of the tonnage of raw or comparatively raw materials already stated. Thus rolled iron is mainly produced from pig iron. As the method of stating the production of 1880 is the same that was observed in 1870, a comparison for the results of both periods cannot be open to objection.

**PRODUCTION IN DETAIL.**  
The following table shows the production of each branch of our iron and steel industries in 1870 and 1880, with the percentage of increase or decrease in the latter year:

Iron and steel products.	Census year 1870.	Census year 1880.	Percentage of increase in 1880.
Pig iron and castings from furnaces.....	2,052,821	3,781,081	84
All products of iron rolling mills.....	2,441,320	2,353,248	53
Bessemer steel finished products.....	19,403	889,896	4,486
Open-hearth steel finished products.....	93,143	93,143	0
Crucible steel finished products.....	98,069	70,319	351
Bismarck and other steel.....	2,285	4,956	117
Products of forges and bloomeries.....	110,808	79,557	35
Total.....	3,655,215	7,265,140	98.76

Of the pig iron produced in the census year 1880, there were produced with charcoal and cold blast, 79,613 tons; with charcoal and hot blast, 355,495 tons; with anthracite, 1,112,735 tons; with bituminous coal and coke, 1,515,107 tons; and with mixed anthracite and coke, 713,932 tons. The furnace castings amounted to only 429 tons. The total production was 3,781,021 tons, of which 12,875 tons were speigleisen. In the following table is presented a comparative statement of iron rolling mill products in 1870 and 1880:

Iron rolling mill products.	1870.	1880.
Bar iron.....	488,834	663,211
Rod iron.....	26,087	145,666
Nail-plate iron converted into cut nails.....	230,225	252,830
Boiler-plate iron.....	54,477	89,500
All other plate iron.....	74,755	94,749
Sheet iron plate.....	531,605	456,917
Iron rails.....	2,217	128,321
Skelp iron.....	33,631	64,468
Muck bar made for sale to other works.....	33,631	96,810
Structural iron.....	2,630	96,843
Roller iron axles.....	48,345	48,345
Fish plates and miscellaneous forms of rod iron.....	82,368	21,384
Railroad spikes, horseshoes, &c., made by iron rolling mills from rolled iron not included above.....	3,793	3,793
Hammered axles.....	1,441,870	2,353,248
Forgings.....	2,353,248	2,353,248

The item of muck bar is an unavoidable duplication, as it reappears as finished iron to be counted a second time. In the Bessemer and open-hearth steel works of the country the following tons of finished products were produced in 1880:

Finished steel products.	Bessemer steel.	Open-hearth steel.
Rails.....	74,475	9,105
Bars.....	45,064	1,134
Rods.....	557	80
Shapes.....	1,700	1,700
Plates.....	21,034	21,034
Other forms.....	26,015	26,794
Total finished product.....	889,896	93,143

In the census year 1870 the production of Bessemer steel finished products was only 19,403 tons. No open-hearth steel products are reported for that year. The quantity of Bessemer steel ingots produced in the census year 1880 was 985,208 tons, and the quantity of open-hearth steel ingots was 84,302 tons. No statistics of ingots produced in 1870 are available for comparison. It will be observed that a larger quantity of finished open-hearth steel products was produced in 1880 than of ingots, which is probably due to the carrying over of ingots from the preceding year and to importations during the census year. The Bessemer steel ingots produced in 1880 are in excess of the finished products. The increase in the production of crucible steel finished products in the decade between 1870 and 1880 was from 28,069 tons to 70,319 tons, or 151 per cent. The production of crucible steel ingots in 1880 was 76,207 tons. The production of blister steel and of steel made by other minor processes was only 228 tons in 1870 and 4056 tons in 1880, and it is not likely to increase in the future. There was a decrease of 35 per cent. in the production of the forges and bloomeries from 1870 to 1880, or from 110,808 tons to 79,557 tons. This decrease is due to the general substitution of improved processes for the forges and bloomeries of our earlier iron history, and it would have been much greater in the decade mentioned if the improved American bloomery, so largely used in Northern New York, had not contributed its large product to swell the production of 1880.

#### RELATIVE RANK IN PRODUCTION OF THE STATES.

The relative rank in production of all the States and Territories which produced iron and steel in 1880 is given in the following table, in tons:

States.	Production.	Rank.
Pennsylvania.....	3,616,668	1
Ohio.....	930,141	2
New York.....	110,034	3
Illinois.....	417,997	4
New Jersey.....	243,860	5
Wisconsin.....	179,035	6
Michigan.....	147,487	7
Massachusetts.....	142,715	8
Missouri.....	141,321	9
Kentucky.....	125,758	10
New York.....	123,751	11
Maryland.....	110,034	12
Indiana.....	96,117	13
Tennessee.....	77,100	14
Alabama.....	69,086	15
Virginia.....	55,729	16
Connecticut.....	38,061	17
Georgia.....	35,118	18
Delaware.....	32,918	19
Kansas.....	30,055	20
California.....	14,000	21
Maine.....	10,866	22
Wyoming Territory.....	9,790	23
Rhode Island.....	8,134	24
New Hampshire.....	7,978	25
Vermont.....	6,690	26
Colorado.....	4,500	27
Oregon.....	3,200	28
Nebraska.....	2,000	29
Texas.....	1,400	30
North Carolina.....	439	31
District of Columbia.....	264	32
South Carolina.....	1	33
Total.....	7,265,140	

All the States which made iron or steel in 1870 increased their production in 1880, except Maine, North Carolina and South Carolina. The greatest percentage of increase in the decade was in the Western States, beginning with Ohio, and in the Southern States, beginning with Delaware, but the greatest actual increase was in Pennsylvania.

#### RAW MATERIAL.

The following table presents the quantities of mineral products used by the iron and steel works in 1880:

Works.	Iron ore, tons.	Limestone, tons.	Anthracite coal, tons.	Bituminous coal, tons.	Coke, tons.
Blast furnaces.....	7,256,684	5,169,140	2,615,181	1,051,651	1,128,755
Bess. & open-hearth steel works.....	359,999	528,749	5,915,177	14,834	
Crucible steel works.....	7,327	140,458	185,655	104,030	
Forges and bloomeries.....	2,128	40,593	224,857	29,791	
Total.....	7,709,718	5,739,140	8,740,866	1,196,275	1,272,575

Of the iron ore and limestone given in the table, at least one-half was purchased from independent producers; of the anthracite coal, nearly all was so purchased; and of the bituminous coal and coke, fully two-

thirds was so purchased. The following table shows the quantities of all other leading raw materials used in 1880 in the manufacture of iron and steel:

	1870.	1880.
Blair furnaces.....	53,069,848	33,408
Rolling mills.....	2,574,691	708,534
Bessemer and open-hearth steel works.....	37,552	422,482
Crucible steel works.....	60,597	13,417
Forges and bloomeries.....	13,043,967	16,053
Total.....	70,851,465	447,778
Charcoal.....	334,048	48,345
Mill cylinder.....	3,506,535	4,477,781
Pig iron.....	447,778	447,778
Old iron rails.....	447,778	447,778
Scrap iron.....	447,778	447,778
Ore blooms.....	447,778	447,778
Pig or scrap blooms.....	447,778	447,778
Muck bar purchased.....	447,778	447,778
Spiegeleisen.....	447,778	447,778
Old steel rails and crop ends.....	447,778	447,778
Bessemer steel ingots and blooms purchased.....	447,778	447,778
Open-hearth ingots and blooms purchased.....	447,778	447,778
Scrap steel.....	447,778	447,778
Swedish billets and bars.....	447,778	447,778
Other billets and bars.....	447,778	447,778
Oil used as fuel.....	447,778	447,778

The large consumption of old iron rails and scrap iron in the rolling mills in 1880 was abnormal, and was the result mainly of the great scarcity of pig iron which followed the sudden revival of a demand for iron and steel products in the summer of 1879.

#### GEOGRAPHICAL DISTRIBUTION OF ALL PRODUCTS.

The whole territory of the United States may be regarded as comprising four grand divisions—the Eastern States, the Southern States, the Western States and Territories and the Pacific States and Territories. Assuming that the Eastern States comprise all of the States lying north of Delaware and east of Ohio, that the Southern States comprise all of the late slaveholding States except Missouri, and that the other divisions require no explanation, we present the following comparative statement of the development of our iron and steel industries in each of the grand divisions in the census year 1880:

Grand Divisions.	Number of establishments.	Capital invested.	Hands employed.	Wages paid.	Tons produced.	Value of all products.
Eastern States.....	350	\$149,497,451	82,424	\$4,751,660	4,771,808	\$93,690,000
Southern States.....	318	\$20,895	20,895	\$2,353,248	64,153	\$3,353,248
Western States and Territories.....	244	\$9,751,690	36,663	\$4,541,587	1,933,069	\$7,933,069
Pacific States and Territories.....	7	\$1,551,603	8,740	\$11,104	31,492	\$1,574,778
Total United States.....	1,005	\$260,740,984	140,978	\$12,657,555	7,265,140	\$106,557,685

In the decade between 1870 and 1880 the iron industry was extended into many new States and Territories. Twenty-five States were engaged in the manufacture of iron or steel in 1870. Thirty States, the District of Columbia and Wyoming Territory made iron in 1880, and about the half of these also made steel. South Carolina made iron in 1870, but does not appear in the statistics for 1880. Its total production in 1870 did not, however, aggregate 500 tons. The iron industry in this State has been prac-

tically abandoned. Between 1870 and 1880 three States for the first time engaged in the manufacture of iron, namely, Colorado, Kansas and Nebraska; also two Territories, namely, Utah and Wyoming. Utah did not, however, make any iron in 1880. It made a small quantity in each of the years 1874, 1875 and 1876, and it will make a larger quantity in the near future. (Since the close of the census year 1880 Washington Territory has commenced to manufacture pig iron, as have also California and Minnesota. California had previously, since 1868, rolled iron at San Francisco.) Minnesota appears in 1880 among iron-manufacturing States, but its statistics relate only to the preparations that had been made to embark in the business. New Hampshire made iron many years ago, but it does not appear in the statistics for 1870; it reappears in the tables for 1880. Oregon and Texas each built a blast furnace in the decade preceding the census year 1870, but they did not make any iron in that year; they appear, however, in the statistics of production for 1880. The District of Columbia once had a blast furnace in operation, but in 1870 it had no iron industry whatever; in 1880 the United States Government owned and operated a small rolling mill at the Washington Navy Yard. The percentage of total production in 1880 was distributed as follows: Pennsylvania, 50 per cent.; Ohio, 13; New York, 8; Illinois, 6; New Jersey, 3; Wisconsin and West Virginia, each over 2 per cent.; Michigan and Massachusetts, each nearly 2 per cent.; Missouri, Kentucky and Maryland, each over 1½ per cent.; Indiana, over 1 per cent.; Tennessee, about 1 per cent.; and all other States and Territories, an aggregate of about 4 per cent.

#### CENTERS OF PRODUCTION.

In the following table is presented a view of the principal centers of production of the iron and steel industries of the United States in the census year 1880. These centers are divided into two classes—the first comprising 15 counties which produced over 100,000 tons of pig iron, blooms and finished products, and the second comprising 17 counties which produced 60,000 and less than 100,000 tons. Six States are represented in the first class, and 8 States in the second class.

#### THE CENTER OF TOTAL PRODUCTION.

The geographical center of total production of the iron and steel industries of the United States is the point at which equilibrium would be established were the country taken as a plane surface, itself without weight but capable of sustaining weight, and loaded with its production of iron and steel, each ton exerting pressure on the pivotal point directly proportioned to its distance therefrom.

The center of production of iron and steel in the United States in the census year 1880 is found to be at 40° 43' north latitude, and 79° 20' longitude west from Greenwich. This point is in Pennsylvania, on the boundary line between Armstrong and Indiana counties, and about twelve miles northeast of Apollo and twelve miles west of Indiana—Laufman & Co.'s rolling mill at Apollo being the nearest iron works. At the center of production thus ascertained iron has never been manufactured in any form.

#### COUNTIES OF THE FIRST CLASS, PRODUCING OVER 100,000 TONS.

Counties.	Tons.
1. Allegheny County, Pa.....	845,146
2. Lehigh County, Pa.....	324,875
3. Northampton County, Pa.....	322,886
4. Cambria County, Pa.....	266,140
5. Cook County, Ill.....	248,479
6. Dauphin County, Pa.....	232,676
7. Mahoning County, Ohio.....	219,057
8. Berks County, Pa.....	215,593
9. Cuyahoga County, Ohio.....	215,194
10. Mercer County, Pa.....	189,881
11. Rensselaer County, N. Y.....	177,067
12. Montgomery County, Pa.....	166,648
13. Lackawanna County, Pa.....	155,073
14. Milwaukee County, Wis.....	155,194
15. St. Louis County, Mo.....	152,644

Total (15 counties).....1,573,671

#### COUNTIES OF THE SECOND CLASS, PRODUCING BETWEEN 60,000 AND 100,000 TONS.


Counties.	Tons.
1. Lawrence County, Pa.....	84,146
2. Lancaster County, Pa.....	81,049
3. Ohio County, W. Va.....	81,049
4. Will County, Ill.....	79,759
5. Montour County, Pa.....	75,361
6. Chester County, Pa.....	75,361
7. Warren County, N. J.....	75,361
8. Trembly County, Ohio.....	73,369
9. Lebanon County, Pa.....	71,149
10. Lawrence County, Ohio.....	7



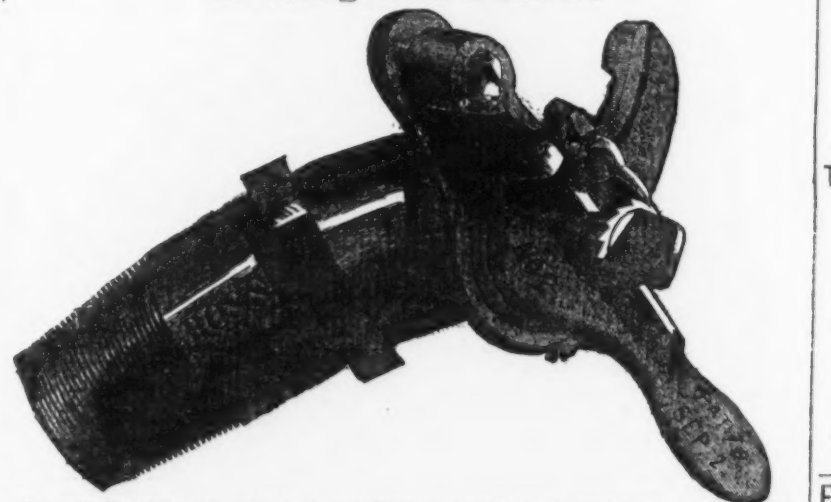
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 Orders solicited from close buyers who want good work.  
**RIPLEY MANUFACTURING CO.,**  
 Unionville, Conn.,  
 Manufacturers of  
 Common Mouse Traps, Porcelain-Lined Lemon Squeezers and House Furnishing Ware.

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 Please notice that we have removed from No. 295 THIRD AVENUE to  
**No. 37 Warren Street, near Church St.,**  
 Where we hope to be favored with a continuance of your generous patronage.  
**J. M. FARRINGTON & CO.,**  
 Successors to DAY, FARRINGTON & CO., Manufacturers of  
**LOCKS, KNOBS, GONGS, BLANK KEYS,**  
 Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

**Cutlery.**  
**CORPORATE MARK**  
  
**Joseph Rodgers & Sons' (LIMITED)**  
**CELEBRATED CUTLERY,**  
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**F. & W. CLATWORTHY, Agents.**  
 The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.  
 To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark

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**Alfred Field & Co.,**  
**COMMISSION MERCHANTS,**  
 New York, Birmingham, Sheffield, Liverpool.

**Guns and Pocket Cutlery.**  
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 All sorts of Hardware and Merchandise for Import and export purchased on commission.



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 Albion Steel Works, Sheffield,  
 MANUFACTURERS OF  
**FILES**  
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**PATENTED ARTICLES OF MALLEABLE IRON:**  
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 NEW pattern Heavy Screw Clamps: strongest in the market.  
 For Sale by all the principal Hardware Dealers.  
 Send for price list.  
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 Air, Hatchet, Powder and Brush Machinery.  
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**ROBERT SORBY & SONS,**  
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**Kangaroo Sheep Shears.**  
 The best Shears made. Every Shears guaranteed.

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**MANN'S Trolling Spoons**  
  
 Sixty varieties manufactured, suitable for Trolling for all kinds of fish that will take an artificial bait, and adapted for any lake or river in the United States.  
 Our Perfect Revolving Spoon is undoubtedly the best general Spoon for taking fish ever offered to the public.  
 Three sizes made—No. 20 for bass, pike, pickerel, or any fish under five pounds weight; No. 21 for large fish, and the best spoon ever made for salmon trout; No. 22 excellent for deep water fishing. Beware of imitations. None genuine except JOHN H. MANN'S name stamped on every spoon.  
 Sold wholesale and retail by the principal dealers in Fishing Tackle.

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**FRED'K MALLESON,**  
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 ON GUT, LANDING RINGS  
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 136, 138, 140, 142 & 144 FIRST STREET,  
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 Maynard's C. S. Planters' Hilling and Bog Hoes; Brade's Crown, Planters' and Hilling; Elwell's Wooding Planters' and Crub, and a variety of other kinds for Home and Export Trade.

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 PAT. DEC. 26, 1871  
 Established in 1889.  
**WORCESTER, MASS.,**  
 Successors to  
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 Manufacturers of  
**THE GENUINE COES Screw Wrenches.**  
 PATENTED,  
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The backstrain when the wrench is used is borne by the bar—not by the handle.  
 The strongest Wrench made, and the only successful Re-enforced Bar.  
 None genuine unless stamped  
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 Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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FOR STRENGTH AND Durability IT HAS NO SUPERIOR. GUARANTEED IN EVERY RESPECT.  
 Wrought Bar, Head and Screw.  
 Owing to the increased demand for these justly Popular Wrenches, we are now manufacturing more than any other establishment in the world.  
 Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.  
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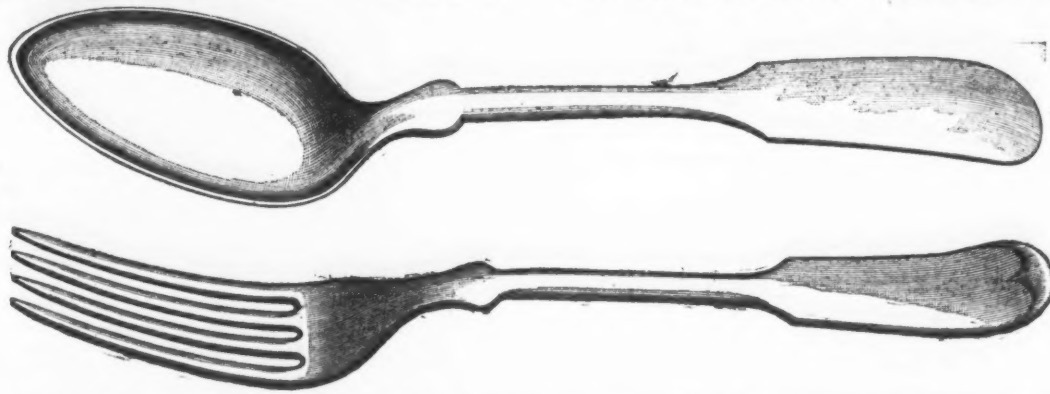
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 Manufacturers of and Wholesale Dealers in  
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 Complete outfits for as small workshop business. Lathes for wood or metal. Circular and Scroll Saws, Formers, Mortisers, Tenoners, &c. Machines on trial if desired. **CHARLES F. LITTLE,** 10 Fulton St., N. Y., and 608 Fulton St., Brooklyn, N. Y. Eastern agency. Factory prices.



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In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

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Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

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NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 18 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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Continue with a fuller stock than ever before the business which has been conducted without interruption for eighty-one years, as

IMPORTERS, MANUFACTURERS' AGENTS,  
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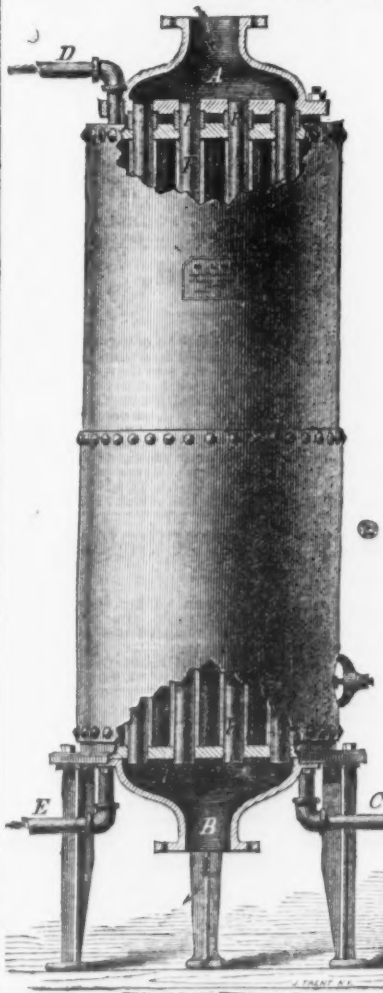
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**JOHN RUSSELL CUTLERY CO.'S** Table Cutlery, Pocket Knives, Butchers', Painters', Druggists' and Household Cutlery, Silver-plated Forks and Spoons.  
**JOSEPH ROBERTS & SON'S** Table Cutlery, Pocket Knives, Scissors, Razors, Erasers.  
**GEORGE WOSTENHOLM & SON'S** Celebrated IXL Pocket Knives, Razors, Farriers' Knives.  
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**WADE & BUTCHER'S** Celebrated Razors.  
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**THOMAS R. CADMAN'S** HENRIALL Razors and Razor Blanks.  
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Sole selling agents for the **Patent Adjustable Floats and Sinkers**.  
Importers of **Calcutta and Japan Bamboo Poles**, Fish Hooks, Swivels, Silver Fishing Gimp, Spanish Silk Worm Gut.  
Selling agents for the **Best Manufacturers of Jointed Fishing Rods, Braided Fishing Lines, Fishing Reels, Artificial Baits, Patent Pocket Flasks, Hammocks**.  
COMPRISED IN ABOVE ARE

More than 1130 Different Patterns of POCKET KNIVES.  
More than 500 Styles and Sizes of SCISSORS AND SHEARS.  
More than 150 Patterns of RAZORS.  
More than 750 Kinds of TABLE CUTLERY.  
And all other articles of CUTLERY in great multitude.  
And over 445 Kinds and Sizes of FISHING LINES.  
55 Patterns (over 950 Different Kinds and Sizes) of FISH HOOKS.  
155 Styles of Fishing Rods. 120 Patterns Fishing Reels. 350 Varieties of Artificial Bait.  
Lists of **Murphy's St. el Goods**, catalogues of our **Skates**, catalogues of our **Fishing Tackle Stock** will be mailed on application to dealers in these lines of goods.

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FOR  
Heating and Purifying Water  
for Steam Boilers.

Patented July 12, 1877.  
HAS STRAIGHT TUBES.  
Simplicity, Reliability and Efficiency, at Less  
Cost than any Other

Write for prices and further information to the  
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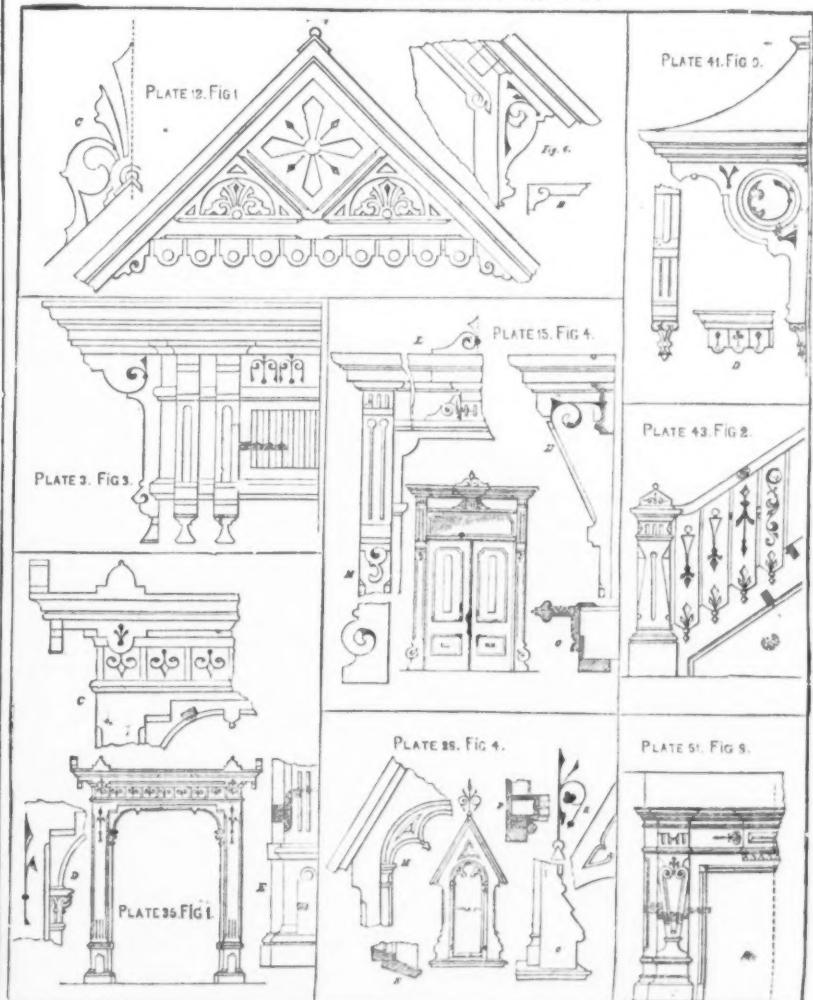
CONTAINING 387 DESIGNS AND 667 ILLUSTRATIONS

Of the Various Parts needed in the Construction of Buildings,  
Public and Private, both for the City and Country; also  
Plans and Elevations of Houses, Stores, Cottages,  
and other Buildings.

By **M. F. CUMMINGS, M. A., Architect.**

Associate Author of "Architecture, by Cummings &amp; Miller."

(CUTS REDUCED FROM PLATES INDICATED.)



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Royal Quarto, Price, Postpaid, Reduced from \$10 to \$6.

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The dilatory manner of doing the work in the new Fulton Market building, in this city, cannot be too severely condemned. For many months past the weather has been remarkably favorable, and yet it has been usual to see no more than half a dozen men on the foundations, and an equal number on the walls, which extend from 171 to 206 feet on either street, so that the progress is almost imperceptible. One of the contractors is reported as saying that the delay is with the contractors for the iron beams, which seems improbable. Meanwhile the public are put to serious inconvenience.

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Anthracite Blast Furnace, with modern improvements; three Hot Blast Stoves, Vertical Hoist, ample Engine and Boiler Power; size, 23 x 40 feet; capacity, 150 tons per week. Will be sold in blast and in perfect working order. Stock can be received by the Philadelphia and Reading Railroad, or Schuylkill Canal, and the new branch of the Pennsylvania Railroad, as surveyed, passes within one square of furnace. Price \$36,000.

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Stock of Hardware, Stoves and Tinware. Value about \$4000. Clean stock guaranteed; good trade established in center of business; best location in Northeastern Ohio, on two lines of railroad; satisfactory reasons given for selling. Address ALEXANDER & HUGHES,  
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By a practical Galvanizer, competent to take charge of works. Can furnish the very best of references. Address GALVANIZER,  
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All the fixtures at the PLYMOUTH FOUNDRY, CONSHOHOCKEN, PA., for the manufacture of modern lengths of cast-iron pipes, consisting of Flasks, Patterns, Molding Machine, Core Barrels, Core Cylinders (wrought iron), Testing Presses, Tarring Tanks, Cupolas and Ladles, Blowing Engines and Steam Cranes. Engines and Cranes made by People's Works, Philadelphia. Apply to L. & R. WINTER,  
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Contents of large Lined Oil Mill, consisting of 28 Hydraulic Presses, Pumps, Steam Pans, Tanks, Roll Mills, Elevators, &c., together or separately. H. C. BRIGGS,  
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To lease for a term of years, at Milton-on-the-Hudson, a good Water-power, with Buildings, which have been used as a Foundry and Machine Shop very successfully. Five minutes from the steamboat landing. Address JOHN B. BALL,  
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WANTED.—A Roller for nine-inch mill and two Heaters. None but strictly temperate men need apply. References as to ability and habits required. Liberal pay guaranteed. Address SYRACUSE IRON WORKS,  
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ENGINEERS AND MACHINE TOOL MAKERS repairing their goods pushing into the English markets, address Mr. WM. GREENWOOD, Machine Agent, 75 West Gate, Bradford, Yorkshire, England, formerly Designer and Erector of Special Machine Tools. Established 1866.

WANTED.—A young man wants a situation as a Clerk in a first-class hardware house. Ten years' experience in the general hardware business. Best of references. Address P. O. BOX 97, Lykens, Pa.

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February 1, 1882.

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- 3 1/2 in. swing, 10 ft. bed, Engine Lathes. February.
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- 10 1/2 in. swing, 10 ft. bed, Engine Lathes. February.
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## IRON.

**American Pig.**—The transactions reported during the week have been light, but the tone of the market continues strong, and deliveries on contracts are sufficient to absorb the weekly output. We continue to quote Foundry No. 1 X, \$26.50 @ \$27; Foundry No. 2 X, \$25; Gray Forge, \$24.

**Scotch Pig.**—Business in Scotch Iron is quiet, attributed in a great measure to the unfavorable weather. The only sale worthy of mention that has come to our notice during the week is 200 tons Glengarnock, on terms that have not transpired. Stocks here are light, and importers, in view of the scarcity of ocean freight room and the high prices ruling, are firm in their views. We quote: Eglington, \$24.50 @ \$25; Carnbroe, \$25.50 @ \$26; Coltness, \$28 @ \$28.50; Glengarnock, \$25.50 @ \$26, and Gartsherrie, \$26 @ \$27.

**Rails.**—Sales are reported of 21,000 tons Steel Rails to the Baltimore and Ohio Railroad at \$55 at mills, and 1100 tons 40-pound Steel at \$61.75 at tidewater. In Iron Rails no new business is reported. We quote, nominally, Steel at mill, \$57 @ \$60, and Iron Rails, \$48 @ \$50.

**Old Rails.**—There is not much activity in this branch of the trade, although the tone of the market continues strong. A sale is reported of 2000 tons Ts for shipment at \$30.50. We quote Ts \$30.50 @ \$31, and D. H., \$32.

**Scrap.**—We hear of a sale of 500 tons Wrought Scrap, but particulars are withheld. Prime Wrought, from yard, is in short supply, and is quoted \$33 @ \$33.50.

## METALS.

**Copper.**—Nothing has transpired during the week. We quote Lake Copper nominally 20¢, and Baltimore as much, although small sales are occasionally effected at ¼¢ less. Producers do not press anything on the market, and of outside lots little offers; at the same time very little is being shipped from the Lake Region by rail this way, there being small inducement to hurry on supplies while the market is so dull. As for the likelihood of large consumers soon re-entering the market, some few of them may have to replenish stock this month or next. The bulk of manufacturers are provided for for four weeks on an average. In Europe the financial disturbance has caused Copper to recede still further, Chili Bars declining to \$66.10, and Best Selected to \$73.10. The depreciation in Chili Bars of something like \$5 from the highest previous point, may have the effect of checking shipments from the West Coast of England for the moment, and this may in its turn steady the London market, unless the discount be raised considerably higher. Our own cablegram from London, to-day, mentions that the disturbed money market affects everything, and that labor agitations cause anxiety, and adds, with reference to Copper, "demand declining, and prices are nominal. Best Selected, nominally, \$72." This shows a fresh giving way of £1.10. Manufacturers are unaltered. We quote: Bottoms, 31¢ @ 32¢; Braziers, 30¢ @ 36¢; Circles, 33¢ @ 36¢; Sheathing, 28¢, and Best Copper, 30¢; Segment Sheets, 33¢; Fire-brick ditto, 30¢.

**Tin.**—The past week has been an unusually dull one, with no business whatever in a wholesale way. The foreign markets are demoralized. London has declined to £107, with Straits Tin, with a downward tendency. Singapore cables \$34 ½ p. In Holland 23,000 slabs Banca sold yesterday at 65.87 ½ guilders @ 50 kg. Shipments from the Straits settlements to the United States in January were 1700 tons, and they are likely to be as large in February, as former speculative purchases were kept back for shipment. Deliveries in January are cable to have been 1500 tons in England and 400 in Holland. Consumption in the United States in January has been 750 tons. We quote the market being more or less nominal. Large lots Straits and Australian, 24 ½¢; Lamb and Flag, 25 ½¢, and Banca, 28¢. Our own cable dispatch this afternoon says: "The market is active and prices weaker. At the sale of Banca in Holland yesterday the price obtained was £109.10. We quote Straits Ingots spot £106.15 and futures £108.10. Tin Plates.—The most important event in the week under review has been the placing on the market of a large block of Coke Tins, say 50,000 boxes, which were absorbed chiefly by the oil packers at about \$5.50. Charcoal Bright and roofing plates have also shared in the decline, but it is not anticipated that the market will go much, if any, lower, provided the money troubles existing on the other side are not of long duration. Per cable, Coke Tin is quoted 17 ½¢ @ 18¢, and Charcoal 19 ½¢ @ 21¢. We quote toward the close, large lines, ordinary brands, 7 box: Charcoal Bright, \$6.25 @ \$6.50; ditto Ternes, \$5.37 ½ @ \$5.75; Coke Tin, \$5.50 @ \$5.62 ½, and ditto Ternes, \$5.25. To the Iron Age, direct per cable this afternoon: "Tin Plates—Market quiet, and prices steady and unchanged."

**Lead.**—Sales are reported for the week of 2000 tons Richmond, February, March and April delivery, at 5¢, and 1000 tons other brands at 5¢ @ 5.15, the market closing quiet, but firm at \$5.15 @ \$5.20 for Common Domestic, and 5 ¼¢ Refined, nominally, nothing having transpired therein. St. Louis quotes \$4.75 @ \$4.90, to which 3¢ freight has to be added. Our own to-day's cable states: "There is more inquiry, and the volume of business has been large. Prices are weaker. We quote English Pig, Common, £14.10. There has been no change in manufacturers' prices: We quote: Pipe, 7 ½¢; Sheet, 8¢; Tin-lined Pipe, 15¢; and Block, 35¢; all less 10¢ to the trade.

**Spelter and Zinc.**—Common Domestic Spelter has been moderately active, closing quiet, but firm, at 5 ½¢ @ 6¢ for Domestic, as to brand, 5 ¼¢ @ 5 ½¢ Silesian. Sheet Zinc.—The market is now well supplied, but nevertheless remains well supported at 7 ½¢ @ 7 ¾¢. To the Iron Age direct, per cable, this

afternoon: "Spelter.—There is but little inquiry and prices are weak. We quote Ordinary, at shipping ports, £17.10."

**Antimony.**—Since the production of Domestic has been stopped for the moment, Cookson's brand is held with all the greater firmness at 15¢.

## COAL.

The Anthracite Coal companies agree to suspend production three days out of six, after the present week, during the month of February; in other words, to work on half time. If the market won't take the Coal, so they say, there is no alternative but to shorten production. As might be inferred, the market is excessively dull, with a tendency to accumulate at the shipping points. Dullness is usual at this season, but more activity was a reasonable expectation but for the continuance of an open winter. One year ago at this time the temperature was low and the demand for Coal quite brisk. The news from the Coal regions is that there is an active demand for Lump and Steamboat sizes, but all other sizes are dull, and the stocks on hand quite large. As to prices, it is difficult to disguise the fact that there is more or less cutting among outsiders, though the regular operators claim that they adhere to circular rates, which, in a general way, may be stated as follows: Wyoming, \$3.90 for Lump, Grate and Chestnut; \$4.05 @ \$4.20 for Egg and Stove; Lehigh, \$4.25 for most descriptions, except Lump, which is \$4.40 @ \$5.25; Reading, \$3.90 @ \$5, except Chestnut, which is \$3.55. In freights there is hardly anything doing. To Boston the rate is \$1.50; Providence, 90 cents; New Haven, 45 cents. At Port Richmond freights are quoted at \$2 @ \$2.10 to Boston, and \$1.75 to Providence.

In Bituminous Coal the demand is fair; New York agents would sell more if they had it, but at present, as trade in Anthracite is dull, vessels go to Baltimore. The price "alongside" in New York is about \$5.15. Cumberland at Baltimore is \$3.60; Clearfield, \$3.50. Georgetown is out of the market.

The total tonnage of Anthracite Coal from all the regions for the week ending January 21, as reported by the several carrying companies, amounted to 367,078 tons, against 545,924 tons in the corresponding week last year. The total amount of anthracite mined for the year is 1,334,950 tons, against 1,211,729 tons for the same period last year. The quantity of Bituminous Coal sent to market for the week amounted to 100,826 tons, against 64,700 tons in corresponding week last year. The total amount of Bituminous mined for the year is 215,948 tons, against 169,014 tons for the corresponding period last year.

## OLD METALS, PAPER STOCK, &amp;c.

The purchasing prices offered by dealers are as follows:

Copper, heavy.....	10	10	10
Copper, light.....	10	10	10
Copper Bottoms.....	10	10	10
Yellow Metal.....	10	10	10
Brass, heavy.....	10	10	10
Brass, light.....	10	10	10
Composition, heavy.....	10	10	10
Lead, heavy.....	10	10	10
Tea Lead.....	10	10	10
Zinc.....	10	10	10
Pewter, No. 1.....	10	10	10
Pewter, No. 2.....	10	10	10
Wrought Iron.....	10	10	10
Light do.....	10	10	10
Store Plate.....	10	10	10
Machinery do.....	10	10	10
Grate Bars.....	10	10	10
Electrotype plates.....	10	10	10
Stereotype plates.....	10	10	10
Small type.....	10	10	10

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen.....	10	10	10
White Cotton, New.....	10	10	10
No. 2.....	10	10	10
White, No. 1.....	10	10	10
Seconds.....	10	10	10
Soft Woollens.....	10	10	10
Mixed Rags.....	10	10	10
Journal Bagging.....	10	10	10
Journal Bagging.....	10	10	10
Book Stock.....	10	10	10
Newspapers.....	10	10	10
Waste Paper and Scraps.....	10	10	10
Kentucky Bale Rope.....	10	10	10

## FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements for the past week:

## IMPORTS.

For the week ending January 28:

Total.....	1880.	1881.	1882.
Prev. reported.....	\$11,753,252	\$8,515,504	\$7,514,215
Since Jan. 1.....	\$35,829,311	\$34,034,572	\$37,166,139

Included in the imports were articles of merchandise valued as follows:

	Quantity.	Value.
Brass goods.....	25	3,344
Iron, sheet, tons.....	148	27,640
Iron, hoop, tons.....	10	641
Railroad bars.....	148	9,321
Iron tubes.....	17	50,257
Iron, other, tons.....	1,608	6,372
Machinery.....	1,308	35,241
Metal goods.....	163	18,640
Nails.....	154	1,466
Needles.....	3	183
Nickel.....	21	9,081
Old metal.....	3	1,474
Plated ware.....	13	43,768
Saddlery.....	1	139
Steel.....	12	2,472
Spelter.....	25	118,045
Sliver.....	12	12,822
Tin boxes.....	7	8,444
Wire.....	200,577	200,577
Wire rods.....	100	1,740
Wire.....	21,482	21,482

The following are the imports of leading articles, compared with previous dates:

	For the week.	2 weeks.	Some time.
Cutlery, pkgs.....	127	633	718
Hardware, pkgs.....	12	63	222
Iron, R. R. wgs.....	5,777	14,071	876
Steel, pkgs.....	12,823	95,133	45,901

Tin boxes..... 45,038 216,909 104,979  
Tin slabs, lbs..... 455,131

## EXPORTS OF SPECIES.

For the week ended Jan. 28:  
Previously reported..... \$236,400  
Total..... \$32,280

Total since January 1, 1882.....	\$1,068,680
Same time in 1881.....	733,374
Same time in 1880.....	765,480
Same time in 1879.....	1,237,047
Same time in 1878.....	1,855,945
Same time in 1877.....	1,909,497
Same time in 1876.....	2,303,836
Same time in 1875.....	10,072,317
Same time in 1874.....	3,195,160
Same time in 1873.....	8,243,182
Same time in 1872.....	15,440,501

## EXPORTS, EXCLUSIVE OF SPECIES.

For the week ended Jan. 31:

Total.....	1882.	1881.	1880.
Prev. reported.....	6,517,309	\$7,121,316	\$6,392,878
Since Jan. 1.....	\$25,886,378	\$27,514,197	\$23,753,737

## IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Feb. 1, 1882:

Hardware.	Order.
Allen R. H. & Co.	Wire, pkgs, 56
Machinery, case, 1	Old fish plates lot, 1
American Xylolite Co.	
Machinery, case, 3	
Piece, 1	
Baker Hermann & Co.	Case, 30
Cutlery and guns, 245	Baring Bros. & Co.
Baldwin Mr.	Blooms, 727
Firearms, case, 1	Cross ends, tons, 3
Barbour Twine Co.	
Machinery, pkgs., 63	Brown Bros. & Co.
Sew. mach., case, 3	Rods, bbls., 1298
Duval H. R.	Brown Wm.
Cases, 7	Shot, 235
Field Alfred & Co.	Brass gds., case, 2
Chains, cks., 8	Coiled Bess' rods, 452
Cases, 13	Coils, 538
Packages, 6	Chicago Spring Co.
Anvils, 78	Bundles, 50
Mules, pkgs., 8	Drexel, Morgan & Co.
Furness, Bannister & Co.	Knoblauch & Lichtenstein
Cases, 2	Blooms, 1760
Godard J. W. & Son.	Case, 20
Cases, 20	Guiche A. H. & Co.
Machines, case, 6	Gatling Gun Co.
Gatling Gun Co.	Cases, 3
Hensel, Bruckmann & Lorch	Cartridge cases, case, 5
Machinery, case, 2	Cases, 3
Hartley, Graham & Co.	Guns, case, 3
Per. caps, case, 9	Hildick A. H.
Cartridge cases, case, 5	Cases, 4
Cases, 3	Vises, 28
Meakin & Taylor.	Forgings, 71
Packages, 107	Bands, 10
McCoy & Sanders.	Bars, 24
Cases, 12	Balls, for Canada, 50
Merchants' Dis. Co.	Old steel, lot, 5
Guns, case, 1	Scrap steel tire, 100,160
Curly, case, 7	Old leaf spring, kg., 32,359
Moss F. W.	Forgings, 71
Files, cks., 7	Bands, 10
Mouquin H.	Bars, 24
Machines, case, 2	Balls, for Canada, 50
Newman Henry.	Old steel, lot, 5
Ironware, case, 10	Scrap steel tire, 100,160
Sandford S.	Old leaf spring, kg., 32,359
Sola R. D.	Forgings, 71
Machinery, box, 1	Bands, 10
Schoverling, Daly & Co.	Bars, 24
Gales, 1	Balls, for Canada, 50
Case, 8	Old steel, lot, 5
Sturzenegger Daniel.	Scrap steel tire, 100,160
Machinery, case, 6	Old leaf spring, kg., 32,359
Terkulie J.	Forgings, 71
Case, 2	Bands, 10
Taylor Thos.	Bars, 24
Cases, 2	Balls, for Canada, 50
Waelela & Duysters.	Old steel, lot, 5
Iron hook nails, 100	Scrap steel tire, 100,160
Wiesbusch, Hilger & Co.	Old leaf spring, kg., 32,359
Guns caps and wads, 10	Forgings, 71
Winchell R. Arms Co.	Bands, 10
Cases, 2	Bars, 24
Witte John G. & Bro.	Balls, for Canada, 50
Cutlery, case, 19	Old steel, lot, 5
Arms, case, 19	Scrap steel tire, 100,160
Order.	Old leaf spring, kg., 32,359
Files, cks., 6	Forgings, 71

Imports.	Order.
Abbott Jere & Co.	Wire, pkgs, 56
Altkman Jas. & Co.	Old fish plates lot, 1
Tin plates, bxs., 202	
Baring Bros. & Co.	Case, 30
Tin plates, bxs., 4455	Baring Bros. & Co.
Bank of Montreal.	Blooms, 727
Tin plates, bxs., 5006	Cross ends, tons, 3
Baker Hermann & Co.	Brown Bros. & Co.
Cases, 5	Rods, bbls., 1298
Brown Bros. & Co.	Brown Wm.
Old brass tubes, 880	Shot, 235
Berge R. Schultze.	Brass gds., case, 2
Zinc powder, cks., 15	Coiled Bess' rods, 452
Bruce & Cook.	Coils, 538
Tin plates, bxs., 340	Chicago Spring Co.
Cort N. L. & Co.	Bundles, 50
Tin plates, bxs., 538	Drexel, Morgan & Co.
Drexel, Morgan & Co.	Knoblauch & Lichtenstein
Black taggers, bxs., 4799	Blooms, 1760
Lead, pkgs., 1673	Case, 20
Dickerson, Van Dusen	Guiche A. H. & Co.
Tin plates, bxs., 3252	Gatling Gun Co.
Elwell Jas. & Co.	Cases, 3
Brass, bbl., 1	Vises, 28
Copper, cks., 2	Forgings, 71
Metal, cks., 2	Bands, 10
Lead, cks., 3	Bars, 24
Greer A. L.	Balls, for Canada, 50
Zinc oxide, cks., 6	Old steel, lot, 5
Gumey, Sperting, Ingram & Co.	Scrap steel tire, 100,160
Tin plates, bxs., 28	Old leaf spring, kg., 32,359
Hayden J. H.	Forgings, 71
Lead, pkgs., 105	Bands, 10
Howard Bros. & Read.	Bars, 24
Case, 1	Balls, for Canada, 50
Howard & Morse.	Old steel, lot, 5
Brass wire cloth, box, 1	Scrap steel tire, 100,160
Hazard & Co.	Old leaf spring, kg., 32,359
Tinware, case, 4	Forgings, 71
Lamarche H. & Sons.	Bands, 10
Rolling mill, case, 50	Bars, 24
Maitland, Phelps & Co.	Balls, for Canada, 50
Old copper, bbl., 1	Old steel, lot, 5
Wheat, fan, 1	Scrap steel tire, 100,160
Case, 3	Old leaf spring, kg., 32,359
N. Y. Lake Erie & W. R. R.	Forgings, 71
Tin plates, bxs., 1105	Bands, 10
Nathan Dreyfus.	Bars, 24
Copper, bbl., 2	Balls, for Canada, 50
Phelps, Dodge & Co.	Old steel, lot, 5
Black taggers, 11	Scrap steel tire, 100,160
Sheet zinc, cks., 25	Old leaf spring, kg., 32,359
Antimony, cks., 50	Forgings, 71
Pope Thos. J. & Bro.	Bands, 10
Spelter, box, 1	Bars, 24
Rogers Henry.	Balls, for Canada, 50
Cases, 4	Old steel, lot, 5
Schoverling, Daly & Co.	Scrap steel tire, 100,160
Gales, 1	Old leaf spring, kg., 32,359
Cartridge cases, case, 3	Forgings, 71
Per. caps, case, 1	Bands, 10
Struller, Lau & Co.	Bars, 24
Per. caps, case, 1	Balls, for Canada, 50
Steglich & Brese.	Old steel, lot, 5
Sheet zinc, cks., 10	Scrap steel tire, 100,160
Tardin S. & Son.	Old leaf spring, kg., 32,359
Brass tubes, pck., 1	Forgings, 71
U. S. Stamping Co.	Bands, 10
Willett & Hauke.	Bars, 24
Sheathing metal, cks., 125	Balls, for Canada, 50
Ximera J.	Old steel, lot, 5
Old copper, lbs., 25,000	Scrap steel tire, 100,160
Order.	Old leaf spring, kg., 32,359
Tin plates, bxs., 27	Forgings, 71
bxs., 103	Bands, 10
Tin &terne plates, bxs., 103	Bars, 24
Old brass, cks., 34	Balls, for Canada, 50
Tinned sheets, case, 1	Old steel, lot, 5
Zinc plates, 1244	Scrap steel tire, 100,160
Spelter, slabs, 512	Old leaf spring, kg., 32,359
Lead, pkgs., 39	Forgings, 71
Lead, cks., 152	Bands, 10
Tin ingots, 1479	Bars, 24
Antimony, cks., 7	Balls, for Canada, 50

## EXPORTS.

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending Jan. 31, 1882:

Dutch West Indies.	Quan.	Val.	Ag. imp. pkgs.	Quan.	Val.
Mf. iron, pkgs. 112	540		Copper, shts. 4	184	
Tower clock, 1	436		Hdw. pkgs. 22	455	
Sew. ma. case, 2	33		Mf. iron, pkgs. 42	424	
Zinc, casks, 18	108		Mach'y, pkgs. 9	1,531	
Hdw. pkgs., 2246	255				
Ptms., gals., 250	250				
Ag. imp. pkgs. 2	50				
Clocks, box, 1	16				
Nails, bxs., 1	150				
Iron, pkgs., 1	150				

Dutch East Indies.	Quan.	Val.	Ag. imp. pkgs.	Quan.
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of this country has been in a state of ferment since the date of my last letter, with a considerable amount of latent excitement, and much anxiety as to the course of prices in the near future. I was enabled last week to inform you on excellent authority that the leading Staffordshire "list" houses would not declare any rise. In having that important intimation, however, I appear to have been in advance of the trade here, seeing that up to the very day of the quarterly meeting at Birmingham there was much uncertainty as to the probable course of events, and a corresponding amount of speculative excitement. To the quarterly gatherings of the ironmasters I will presently allude at greater length. I may state here, nevertheless, that there exists a very strong party among the producers, as well as in the ranks of the merchants, who are in favor of pushing up prices, and who contend that a general rise ought to have been declared last week. In this party are the majority of the manufacturers of common and medium iron, who are almost universally crowded with orders, and who have recently so considerably augmented their prices that their quotations are within a few shillings of those of the marked bar houses. This being so, these gentlemen feel aggrieved that the makers of the better sort of iron have not moved ahead in proportion, rightly judging that the small difference in quotations will lead many buyers to give their orders for the superior iron. The merchants who espouse the same policy do so in furtherance of their own aims and ends. Such of them as bought at low figures are desirous of realizing on the rising market, while others, who do not happen to be holders at the moment, would prefer a "general scramble" in the course of which they would probably pick up a few consolatory crumbs. Seeing that these optimistic opinions exist and are loudly pushed, it is satisfactory, rather than the contrary, to note that the "list" houses have had sufficient courage to resist the enormous pressure brought to bear upon them, with one exception, that of Messrs. Bradley & Sons, whose brand is S. C. (crown). They did not, therefore, press the claims of the boomers, and that for two, at least, good reasons. The first of these reasons is that the best firms of South Staffordshire are not yet by any means busy—indeed, two or three of them have not had full work on one shift. They are filling up, however, now, and as is stated above, are clearing their decks for emergencies. The second reason is the important one of wages. The men are on the alert in all directions, and have arrived at the conclusion that trade has improved to such an extent that they ought to be favored with higher rates of remuneration. To have declared a general advance in selling prices, therefore, would have been to fan this incipient agitation into a dangerous blaze—a responsibility which those concerned felt should



not be lightly incurred. As a means of evading the difficulty, the producers ought to secure orders on the condition that the prices should be those ruling at the next quarter day. In that way the men would not know what was being done, and the prices realized would not enter into the calculations of sliding scale accountants for the current quarter. Buyers, however, could not see their way to the acceptance of such onerous conditions, and, as a consequence, the transactions effected were minimized. It is plain that such must be the result, inasmuch as the advances in the interval might mean 10, 20, or 30 % a ton extra, and not only so, but buyers would not know how to ship or dispose of their lots in order to cover themselves. The idea, therefore, may be termed a failure. Quotations being now largely withdrawn, it may be expected that the next few weeks will bring about alterations which will cut the knot now existing. It is pretty certain, at all events, that the majority of the works are fairly engaged, many of them having employment assured for several months. Crude irons are even firmer than finished materials, except in the open market, which, as you know, is not by any means a safe or sure criterion of the actual state of the trade. At Glasgow the week has been a variable one as regards warrants, which have been knocked about in both directions, and have come down from 53 1/2 to about 52 1/2, at which they now stand. This is the outcome of speculation, of course, but it is also an effect of the limited shipments. The dearth of freights, caused by the want of return cargoes from your ports, is throwing what shipments there are into the hands of the regular liners, the owners of which have now reached 20 1/2 ton in full for pig. Glasgow to New York. These high figures are bringing forward sailors, and I hear of one case in which a 1300-ton sailing vessel has been chartered from Leith, on the east coast of Scotland, to New York, at 13 1/2 ton, in full. Such charges naturally tend to restrict the shipments which would otherwise take place, were freights at anything like the 5 1/2 ton which ruled a year ago. In Cleveland, pig iron is very firm on the basis of about 44 for No. 3, prompt, while plates and certain other finished iron of the North of England have gone up 5 1/2 @ 10 1/2 ton. All the foundries, mills, &c., are fully engaged. The West Coast hematite smelters are largely sold forward and are making heavy deliveries at about 63 1/2 @ 64 for mixed lots of Nos. 1, 2 and 3. In Shropshire and elsewhere pig irons are all firm and in good request. On the whole, indeed, I do not see any reason for fearing an immediate collapse here, albeit I am also unable to perceive any valid excuse for rushing up prices. In all probability the golden mean of steady augmentations will prevail.

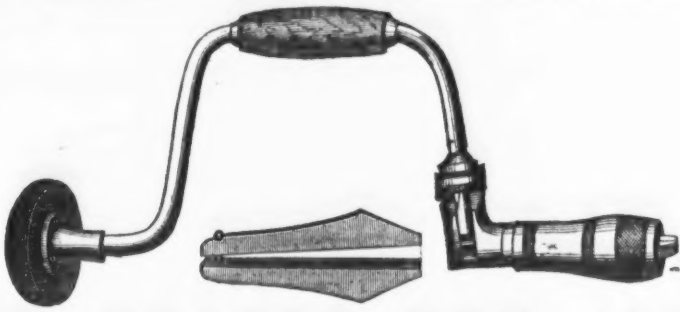
**THE QUARTERLY MEETINGS.** To which I have made some reference above were held last week at Middlesbrough, Wolverhampton and Birmingham on Tuesday (January 10), Wednesday and Thursday respectively. The meeting at Middlesbrough was simply an enlarged ordinary change gathering and mostly dealt with crude irons. There was a general feeling of satisfaction with the position and prospects of the districts, in which there only now remain two establishments not in operation. Pig was as quoted elsewhere: Plates, 27 1/2; Bars and Angles, 26 1/2 @ 27 1/2. At the Wolverhampton meeting prices were firm and intending buyers were reported numerous, but producers were so firm in their views and requirements that less was done than might otherwise have been the case. The makers of common iron were especially stiff as regards bars, sheets, strip and plates. At Birmingham, on Thursday, there was an enormous attendance, including your humble servant. The Exchange was more than filled, the street outside being converted into an open-air mart for the time being. Representative producers from all parts of the country were present, and the buyers, or would-be buyers, were from London, Manchester, Liverpool, Bristol, Glasgow, Leeds, Sheffield, Middlesbrough, the Continent, Australia and even from the United States. The business done was fairly good, and inquiries were "thick as leaves in Vallambrosa." Many of these "feelers" have no doubt since resulted in sales. There was much curiosity at the outset as to the course of leading prices, but in finished iron of the "list" order, the only change declared was a 10 1/2 rise by John Bradley & Sons, of Stonebridge, who are often referred to under their old title of "Fosters." This change rendered the list figures a little absurd, seeing that Lord Dudley quoted 28 2/6, Messrs. Barrows & Sons and others 27 1/2, and Messrs. Philip Williams & Sons 27. Since the meeting, however, circulars have been issued withdrawing all open quotations, and announcing that orders can only be executed at the prices ruling at the time of their acceptance. This is read to mean an early advance. Lord Dudley's works are fairly engaged. Mr. Fisher Smith tells me he has sent several lots of plating bars to the States for the use of your ax makers, and has other such commissions under execution. Unmarked iron ruled very firm, and of pig iron there were considerable sales. The Shropshire people put up hot and cold blast pig, 5 1/2; galvanized iron was 20 1/2; fencing wire, 10 1/2; plain and other sheets, 20 1/2; many other sorts were irregularly dealt. The galvanized iron manufacturers held a meeting, at which they fixed the minimum price of 22 and 24 gauge common galvanized at 25 1/2. 1 1/2 ton f. o. b. London, with the usual extras for best brands; 18 and 20 gauges to be 21 less than 22 and 24. The works were all reported well engaged. The tin-plate manufacturers met on the preceding evening, and elected Mr. E. W. Flower, of the Melwyn Works, Neath, South Wales, chairman, in the room of Mr. John W. Saunders, deceased, of Cookley. The trade was reported better, and prices were stated to be 10 1/2 @ 20 for 1 C Coke, and 23 1/2 @ 24 for charcoal. Stocks were reported to be rapidly falling. Something was said about a new combination for restricting production, but it does not appear to have been thoroughly discussed or adopted. Throughout the whole of the trades and industries represented at the Exchange meeting, there was a confident tone and a generally expressed expectation that prices would rise in all cases of any substantial over-

flow of orders from your market to this country. I subjoin a selection of quotations at which sales were actually effected at one or other of the quarterly meetings, particularly at Birmingham:

	£ s. d.	£ s. d.
Scotch warrants.....	62 0	62 0
Gartsherrie, No. 1.....	62 0	62 0
Coltness.....	62 0	62 0
Middlesbrough, No. 1.....	47 6	47 6
Middlesbrough, No. 2.....	47 6	47 6
Middlesbrough, No. 3.....	47 6	47 6
Middlesbrough, No. 4.....	47 6	47 6
Middlesbrough, No. 5.....	47 6	47 6
Middlesbrough, No. 6.....	47 6	47 6
Middlesbrough, No. 7.....	47 6	47 6
Middlesbrough, No. 8.....	47 6	47 6
Middlesbrough, No. 9.....	47 6	47 6
Middlesbrough, No. 10.....	47 6	47 6
Middlesbrough, No. 11.....	47 6	47 6
Middlesbrough, No. 12.....	47 6	47 6
Middlesbrough, No. 13.....	47 6	47 6
Middlesbrough, No. 14.....	47 6	47 6
Middlesbrough, No. 15.....	47 6	47 6
Middlesbrough, No. 16.....	47 6	47 6
Middlesbrough, No. 17.....	47 6	47 6
Middlesbrough, No. 18.....	47 6	47 6
Middlesbrough, No. 19.....	47 6	47 6
Middlesbrough, No. 20.....	47 6	47 6
Middlesbrough, No. 21.....	47 6	47 6
Middlesbrough, No. 22.....	47 6	47 6
Middlesbrough, No. 23.....	47 6	47 6
Middlesbrough, No. 24.....	47 6	47 6
Middlesbrough, No. 25.....	47 6	47 6
Middlesbrough, No. 26.....	47 6	47 6
Middlesbrough, No. 27.....	47 6	47 6
Middlesbrough, No. 28.....	47 6	47 6
Middlesbrough, No. 29.....	47 6	47 6
Middlesbrough, No. 30.....	47 6	47 6
Middlesbrough, No. 31.....	47 6	47 6
Middlesbrough, No. 32.....	47 6	47 6
Middlesbrough, No. 33.....	47 6	47 6
Middlesbrough, No. 34.....	47 6	47 6
Middlesbrough, No. 35.....	47 6	47 6
Middlesbrough, No. 36.....	47 6	47 6
Middlesbrough, No. 37.....	47 6	47 6
Middlesbrough, No. 38.....	47 6	47 6
Middlesbrough, No. 39.....	47 6	47 6
Middlesbrough, No. 40.....	47 6	47 6
Middlesbrough, No. 41.....	47 6	47 6
Middlesbrough, No. 42.....	47 6	47 6
Middlesbrough, No. 43.....	47 6	47 6
Middlesbrough, No. 44.....	47 6	47 6
Middlesbrough, No. 45.....	47 6	47 6
Middlesbrough, No. 46.....	47 6	47 6
Middlesbrough, No. 47.....	47 6	47 6
Middlesbrough, No. 48.....	47 6	47 6
Middlesbrough, No. 49.....	47 6	47 6
Middlesbrough, No. 50.....	47 6	47 6
Middlesbrough, No. 51.....	47 6	47 6
Middlesbrough, No. 52.....	47 6	47 6
Middlesbrough, No. 53.....	47 6	47 6
Middlesbrough, No. 54.....	47 6	47 6
Middlesbrough, No. 55.....	47 6	47 6
Middlesbrough, No. 56.....	47 6	47 6
Middlesbrough, No. 57.....	47 6	47 6
Middlesbrough, No. 58.....	47 6	47 6
Middlesbrough, No. 59.....	47 6	47 6
Middlesbrough, No. 60.....	47 6	47 6
Middlesbrough, No. 61.....	47 6	47 6
Middlesbrough, No. 62.....	47 6	47 6
Middlesbrough, No. 63.....	47 6	47 6
Middlesbrough, No. 64.....	47 6	47 6
Middlesbrough, No. 65.....	47 6	47 6
Middlesbrough, No. 66.....	47 6	47 6
Middlesbrough, No. 67.....	47 6	47 6
Middlesbrough, No. 68.....	47 6	47 6
Middlesbrough, No. 69.....	47 6	47 6
Middlesbrough, No. 70.....	47 6	47 6
Middlesbrough, No. 71.....	47 6	47 6
Middlesbrough, No. 72.....	47 6	47 6
Middlesbrough, No. 73.....	47 6	47 6
Middlesbrough, No. 74.....	47 6	47 6
Middlesbrough, No. 75.....	47 6	47 6
Middlesbrough, No. 76.....	47 6	47 6
Middlesbrough, No. 77.....	47 6	47 6
Middlesbrough, No. 78.....	47 6	47 6
Middlesbrough, No. 79.....	47 6	47 6
Middlesbrough, No. 80.....	47 6	47 6
Middlesbrough, No. 81.....	47 6	47 6
Middlesbrough, No. 82.....	47 6	47 6
Middlesbrough, No. 83.....	47 6	47 6
Middlesbrough, No. 84.....	47 6	47 6
Middlesbrough, No. 85.....	47 6	47 6
Middlesbrough, No. 86.....	47 6	47 6
Middlesbrough, No. 87.....	47 6	47 6
Middlesbrough, No. 88.....	47 6	47 6
Middlesbrough, No. 89.....	47 6	47 6
Middlesbrough, No. 90.....	47 6	47 6
Middlesbrough, No. 91.....	47 6	47 6
Middlesbrough, No. 92.....	47 6	47 6
Middlesbrough, No. 93.....	47 6	47 6
Middlesbrough, No. 94.....	47 6	47 6
Middlesbrough, No. 95.....	47 6	47 6
Middlesbrough, No. 96.....	47 6	47 6
Middlesbrough, No. 97.....	47 6	47 6
Middlesbrough, No. 98.....	47 6	47 6
Middlesbrough, No. 99.....	47 6	47 6
Middlesbrough, No. 100.....	47 6	47 6

Among the other quotations of the time being I may mention the following: Iron rails, 25 1/2 @ 25 1/2; old rails, 24 1/2 @ 25 1/2; c. i. f. Baltimore for D. H.; ditto flanges, 24 2/6; c. i. f. New York; heavy wrought scrap, 24 7/6; c. i. f. Philadelphia; old cast-iron railway chairs, 22 1/2 @ 22 1/2; Bessemer billets above .60 of carbon, 27 1/2 @ 27 1/2; below .60 carbon, 27 @ 27 1/2; and iron billets below .60 carbon, 26 1/2 @ 26 1/2; Bessemer blooms, 7 x 7 inch, at usual ports, 25 1/2; f. o. b.; steel rails, 30 lb. and upward (with many American inquiries), 26 1/2 @ 26 1/2. Metals as per cablegram at date. Cut nails advanced 6d. 1/2 cwt. to-day. Middlesbrough cut nails, 6d. above the following figures: Clasp, rose, clout, tip and sacking, 1 1/2 cwt., 1 1/2 inch, 17 1/2; 1 1/2 inch, 16 1/2; 1 1/2 inch, 15 1/2; 1 1/2 inch, 14 1/2; 1 1/2 inch, 13 1/2; 1 1/2 inch, 12 1/2; 1 1/2 inch, 11 1/2; 1 1/2 inch, 10 1/2; 1 1/2 inch, 9 1/2; 1 1/2 inch, 8 1/2; 1 1/2 inch, 7 1/2; 1 1/2 inch, 6 1/2; 1 1/2 inch, 5 1/2; 1 1/2 inch, 4 1/2; 1 1/2 inch, 3 1/2; 1 1/2 inch, 2 1/2; 1 1/2 inch, 1 1/2; 1 1/2 inch, 1/2; 1 1/2 inch, 1/4; 1 1/2 inch, 1/8; 1 1/2 inch, 1/16; 1 1/2 inch, 1/32; 1 1/2 inch, 1/64; 1 1/2 inch, 1/128; 1 1/2 inch, 1/256; 1 1/2 inch, 1/512; 1 1/2 inch, 1/1024; 1 1/2 inch, 1/2048; 1 1/2 inch, 1/4096; 1 1/2 inch, 1/8192; 1 1/2 inch, 1/16384; 1 1/2 inch, 1/32768; 1 1/2 inch, 1/65536; 1 1/2 inch, 1/131072; 1 1/2 inch, 1/262144; 1 1/2 inch, 1/524288; 1 1/2 inch, 1/1048576; 1 1/2 inch, 1/2097152; 1 1/2 inch, 1/4194304; 1 1/2 inch, 1/8388608; 1 1/2 inch, 1/16777216; 1 1/2 inch, 1/33554432; 1 1/2 inch, 1/67108864; 1 1/2 inch, 1/134217728; 1 1/2 inch, 1/268435456; 1 1/2 inch, 1/536870912; 1 1/2 inch, 1/1073741824; 1 1/2 inch, 1/2147483648; 1 1/2 inch, 1/4294967296; 1 1/2 inch, 1/8589934592; 1 1/2 inch, 1/17179869184; 1 1/2 inch, 1/34359738368; 1 1/2 inch, 1/68719476736; 1 1/2 inch, 1/137438953472; 1 1/2 inch, 1/274877906944; 1 1/2 inch, 1/549755813888; 1 1/2 inch, 1/1099511627776; 1 1/2 inch, 1/2199023255552; 1 1/2 inch, 1/4398046511104; 1 1/2 inch, 1/8796093022208; 1 1/2 inch, 1/17592186044416; 1 1/2 inch, 1/35184372088832; 1 1/2 inch, 1/70368744177664; 1 1/2 inch, 1/140737488355328; 1 1/2 inch, 1/281474976710656; 1 1/2 inch, 1/562949953421312; 1 1/2 inch, 1/1125899906842624; 1 1/2 inch, 1/2251799813685248; 1 1/2 inch, 1/4503599627370496; 1 1/2 inch, 1/9007199254740992; 1 1/2 inch, 1/18014398509481984; 1 1/2 inch, 1/36028797018963968; 1 1/2 inch, 1/72057594037927936; 1 1/2 inch, 1/144115188075855872; 1 1/2 inch, 1/288230376151711744; 1 1/2 inch, 1/576460752303423488; 1 1/2 inch, 1/1152921504606846976; 1 1/2 inch, 1/2305843009213693952; 1 1/2 inch, 1/4611686018427387904; 1 1/2 inch, 1/9223372036854775808; 1 1/2 inch, 1/18446744073709551616; 1 1/2 inch, 1/36893488147419103232; 1 1/2 inch, 1/73786976294838206464; 1 1/2 inch, 1/147573952589676412928; 1 1/2 inch, 1/295147905179352825856; 1 1/2 inch, 1/590295810358705651712; 1 1/2 inch, 1/1180591620717411303424; 1 1/2 inch, 1/2361183241434822606848; 1 1/2 inch, 1/4722366482869645213696; 1 1/2 inch, 1/9444732965739290427392; 1 1/2 inch, 1/18889465931478580854784; 1 1/2 inch, 1/37778931862957161709568; 1 1/2 inch, 1/75557863725914323419136; 1 1/2 inch, 1/151115727451828646838272; 1 1/2 inch, 1/302231454903657293676544; 1 1/2 inch, 1/604462909807314587353088; 1 1/2 inch, 1/1208925819614629174706176; 1 1/2 inch, 1/2417851639229258349412352; 1 1/2 inch, 1/4835703278458516698824704; 1 1/2 inch, 1/9671406556917033397649408; 1 1/2 inch, 1/19342813113834066795298816; 1 1/2 inch, 1/38685626227668133590597632; 1 1/2 inch, 1/77371252455336267181195264; 1 1/2 inch, 1/154742504910672534362390528; 1 1/2 inch, 1/309485009821345068724781056; 1 1/2 inch, 1/618970019642690137449562112; 1 1/2 inch, 1/1237940039285380274899124224; 1 1/2 inch, 1/2475880078570760549798248448; 1 1/2 inch, 1/4951760157141521099596496896; 1 1/2 inch, 1/9903520314283042199192993792; 1 1/2 inch, 1/19807040628566084398385987584; 1 1/2 inch, 1/39614081257132168796771975168; 1 1/2 inch, 1/79228162514264337593543950336; 1 1/2 inch, 1/158456325028528675187087900672; 1 1/2 inch, 1/316912650057057350374175801344; 1 1/2 inch, 1/633825300114114700748351602688; 1 1/2 inch, 1/1267650600228229401496703205376; 1 1/2 inch, 1/2535301200456458802993406410752; 1 1/2 inch, 1/5070602400912917605986812821504; 1 1/2 inch, 1/10141204801825835211973625643008; 1 1/2 inch, 1/20282409603651670423947251286016; 1 1/2 inch, 1/40564819207303340847894502572032; 1 1/2 inch, 1/81129638414606681695789005144064; 1 1/2 inch, 1/162259276829213363391578010288128; 1 1/2 inch, 1/324518553658426726783156020576256; 1 1/2 inch, 1/649037107316853453566312041152512; 1 1/2 inch, 1/1298074214633706907132624082305024; 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1 1/2 inch, 1/467680523945888933825179146469210566267928313856; 1 1/2 inch, 1/





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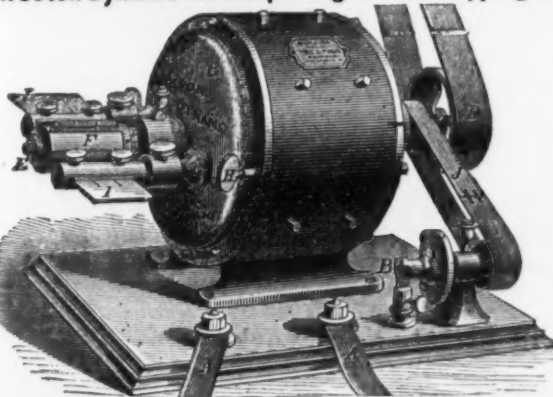
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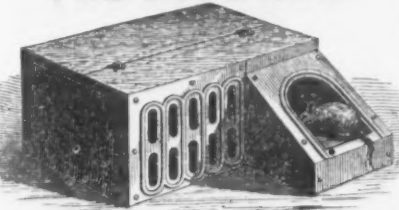
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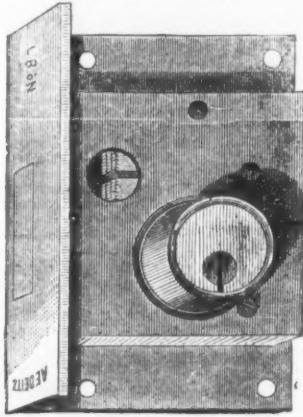
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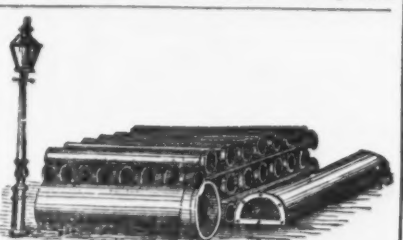
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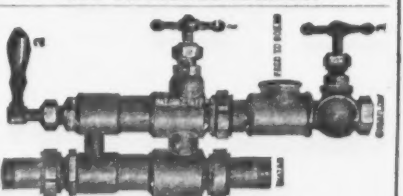
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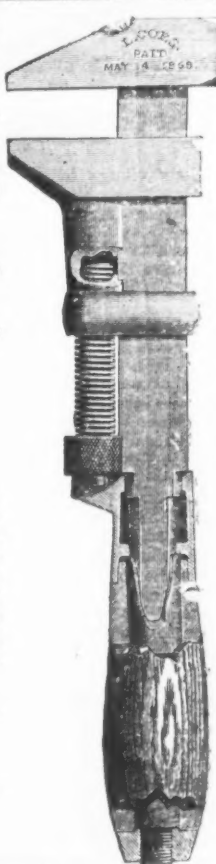
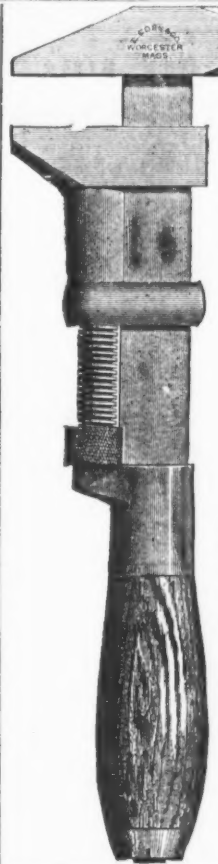


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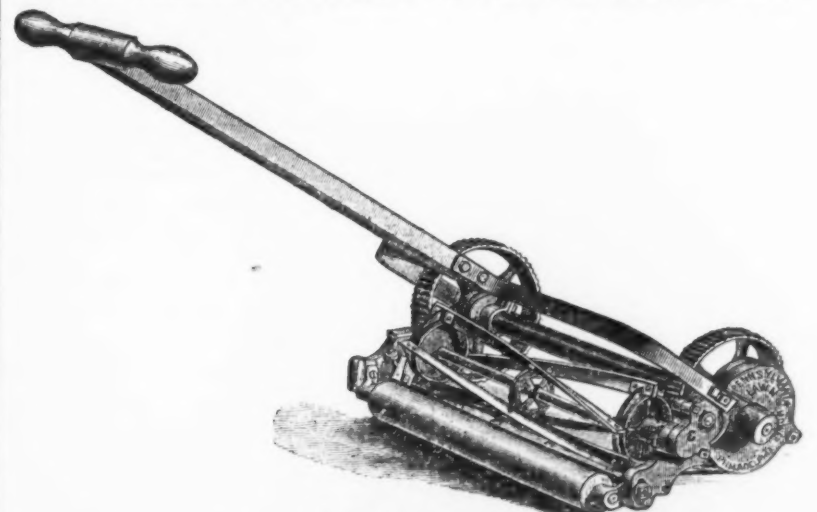


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**VARIETY IRON WORKS.**

**KYSER & REX,**

Manufacturers of

**Hardware Specialties, Iron Toys, Novelties**  
**and Housefurnishing Hardware,**

Main Office and Factory: Trenton Ave. and Margaretta St., Frankford, Philadelphia  
Branch Office, 19 & 21 S. 4th St., Phila. Hardware specialties manufactured to order



## The Inventor of the Circular Saw.

A writer in the Toledo (Ohio) *Telegram* is authority for the following bit of history: In a lonely, secluded spot in the northwest corner of the cemetery near the ever beautiful little village of Richmond, Kalamazoo County, Mich., the reader can find, on a pure white marble slab, nearly concealed from view by a large cluster of lilac bushes, engraved the simple inscription: "Benjamin Cummings, born 1772, died A. D. 1843." And who was Benjamin Cummings? He was the inventor of the circular saws now in use in this country and in Europe. Nearly sixty years ago, at Burtonville, N. Y., and Amsterdam, this man hammered out, at his own blacksmith's anvil, the first circular saw known to mankind. He was a noted pioneer in Richmond; a first cousin to one of the Presidents of the United States; a slave-owner in New York State; a leading Mason in the days of Morgan, at whose table the very elect of the great State of New York feasted and drank freely of his choice liquors and wines; a vessel owner on the North River before the days of steamboats; a captain in the war of 1812, where, after having three horses shot from under him, with one stroke of his sword he brought his superior officer to the ground for insult and because he was a traitor and a coward, and, after having been court-martialed, instead of having been shot, he was appointed colonel in his place. And in this lonely grave are the ashes of the man who, nearly seventy years ago, at Albany, N. Y., took up and moved bodily large brick buildings, and, to the wonder and astonishment of the world, constructed a mile and a half of the Erie Canal through a bed of rock, and who also built, on contract, those first low bridges over the same. He also aided in the construction of the first ten miles of railroad built in the United States, and founded both the villages of Esperance and Bostonville, on the old Schoharie, near Amsterdam. The study and aim of this man's life appeared to be to accomplish that which none other could accomplish, and when the object sought was secured, he passed it as quietly by as he would the pebbles on the seashore.

**A Very Expensive Strike.**—One of the most prolonged and expensive strikes that has occurred within recent years in Philadelphia is that of the gold beaters who were formerly employed in the works of Robert E. Hastings & Co., at Seventh and Cherry streets. The trouble began on May 2, when the entire force of men, boys and girls simultaneously quit work, and for a time threatened the existence of the largest gold-beating firm in the world. The fight from that time until the present, nearly nine months, has been bitterly waged, with astonishing losses to both parties. There was a general meeting on Jan. 28 of Union No. 2, that branch of the organization which embraces the members on strike. The striking committee reported that a break had occurred in their lines, inasmuch as two of their members had returned to work, and that all efforts to cause them to renew their allegiance to the union had failed. This dispiriting news was supplemented by a report of the Finance Committee. This document states that up to September the total loss to the union for the support of the strikers and other expenses incurred in efforts to thwart Mr. Hastings in his endeavor to import workmen amounted to \$19,000. For the maintenance of those remaining out of employment and other expenses the union has expended \$380, while the strikers themselves who remain idle have lost in wages \$11,472. The number of gold beaters in the country is not more than 500, and the tax upon them is severe, being no less than \$2.50 per week since the beginning of the trouble.

The House Committee on Education and Labor have authorized Representative Page, of California, to report to Congress for passage a bill to restrict Chinese immigration. This bill, which is compounded of the several measures on the same subject heretofore introduced by Representatives Page, of California, and Willis, of Kentucky, provides for wholly suspending the immigration of Chinese laborers to the United States during a period of twenty-five years. Those who are now here are to be allowed to go and come at pleasure, if provided with prescribed certificates of identification. It is scarcely probable that so foolish a measure will receive the serious attention of Congress.

The Duryea Experimental Furnace Company, of Cleveland, Ohio, have just invested in a large quantity of iron-mining lands on the other side of the river, near Hull, and will, it is understood, engage extensively in smelting operations next spring.

## BAR IRON SHEARS

Hand Lever Shears, cutting Flat Bar Iron, 3/4x2, 5/8x3, 3/4x4, and 1 inch round, smoothly, leaving good ends; weight, 375 lbs.; reduced price, \$65, net. Next smaller size cuts 3/4x2 flat and 3/4 inch round; weight, 165 lbs.; \$50. Smallest size cuts 5/16 flat and 1/2 inch round, \$35.

These are the most powerful Bar-Iron Shears for Blacksmith work ever invented, while in price they are below any shear of equal capacity in the market.

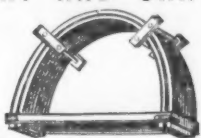
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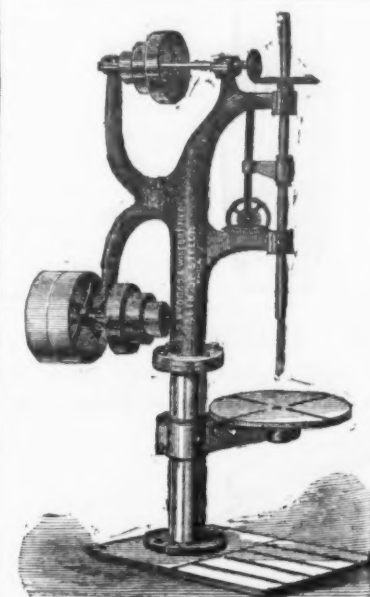
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Manufactured from Selected Pennsylvania Timber.  
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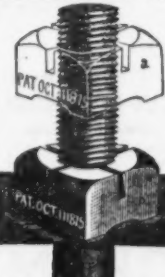


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New Engine Lathes, 18, 22 and 24-inch swing. Second hand Column Drill, 38-inch swing.

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Designed for places of great strain and vibration. Only one nut is used. The nut will not break. It will not strip its thread. The bolt is always in perfect condition. The bolt will not loosen in its work. No washer or other auxiliary pieces needed. Is easily applied, and removed when necessary requires, without difficulty, in as perfect condition as when first put on.

Office, Room 2, Agawam Bank Building. J. W. LABAREE, Sec'y and Treas. New York Office: 113 Liberty St. Chicago: 154 Lake St.

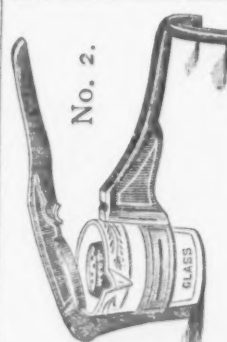
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Silicon.....	2.692
Sulphur.....	None.
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Calcium.....	.031
Manganese.....	Trace.
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Amount of pure metallic iron found.....	100.000
	92.540

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We like the "Salem" Bucket. Ship us 55 more at once. STRATFORD CENTRAL MINING CO., Columbus, O.

It is nearer Perfection in every respect than any other Bucket made.

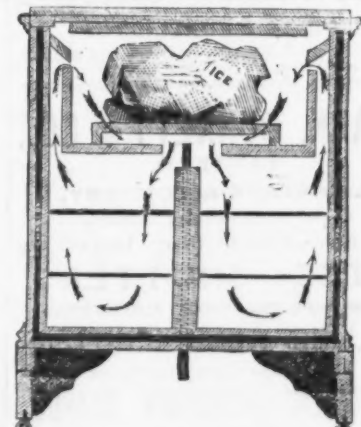
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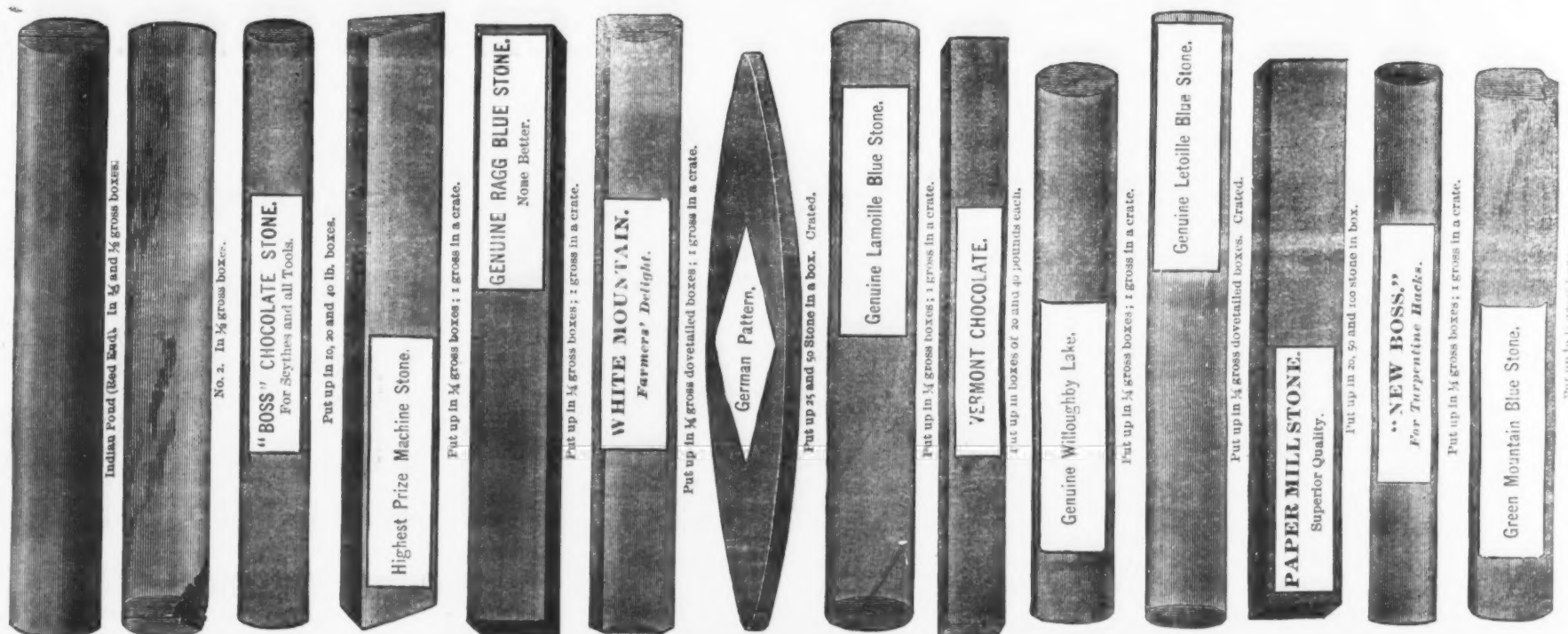


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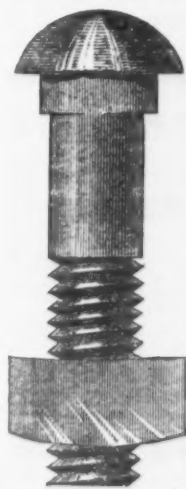
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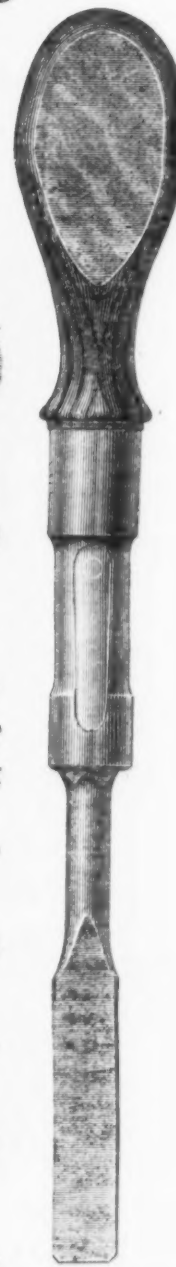
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Combines It is  
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Beauty. Light and Easy.

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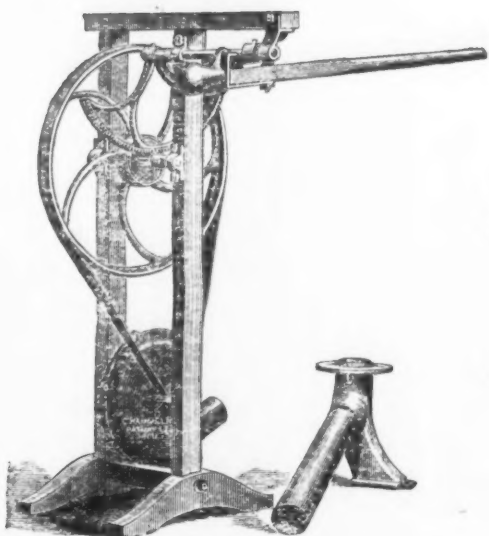
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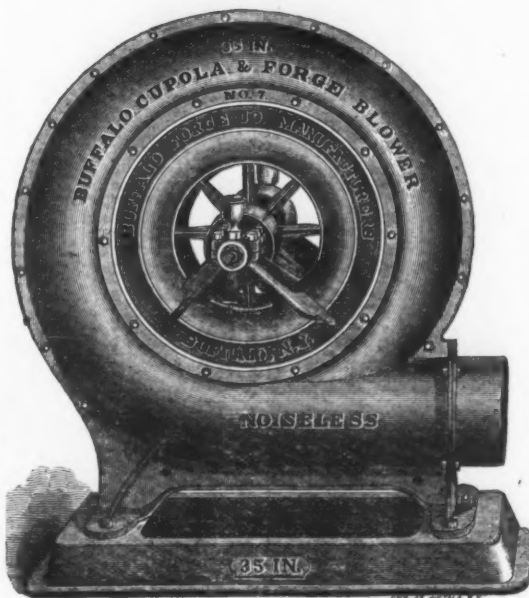


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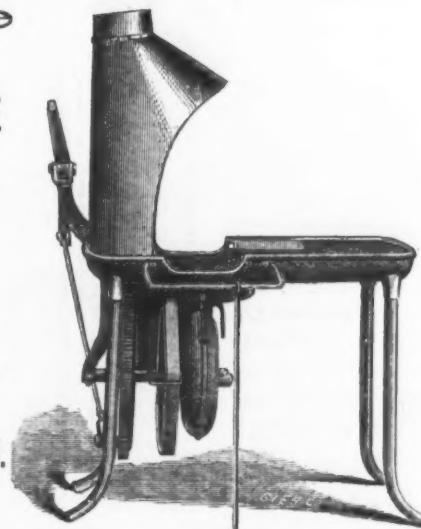
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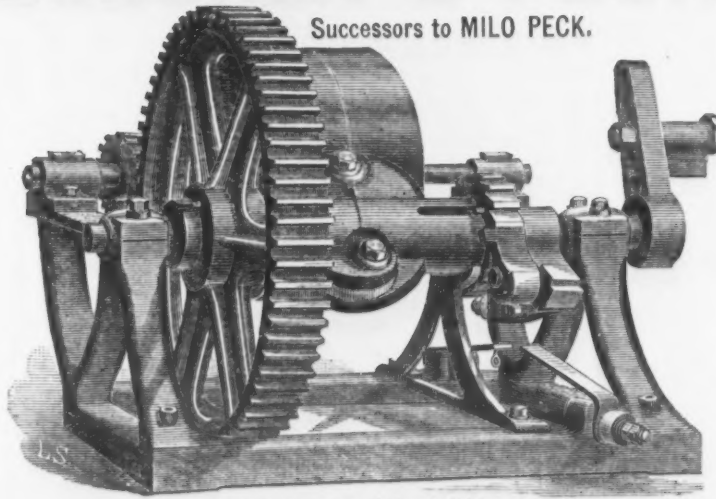
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Latest Improved Peck Lifter.

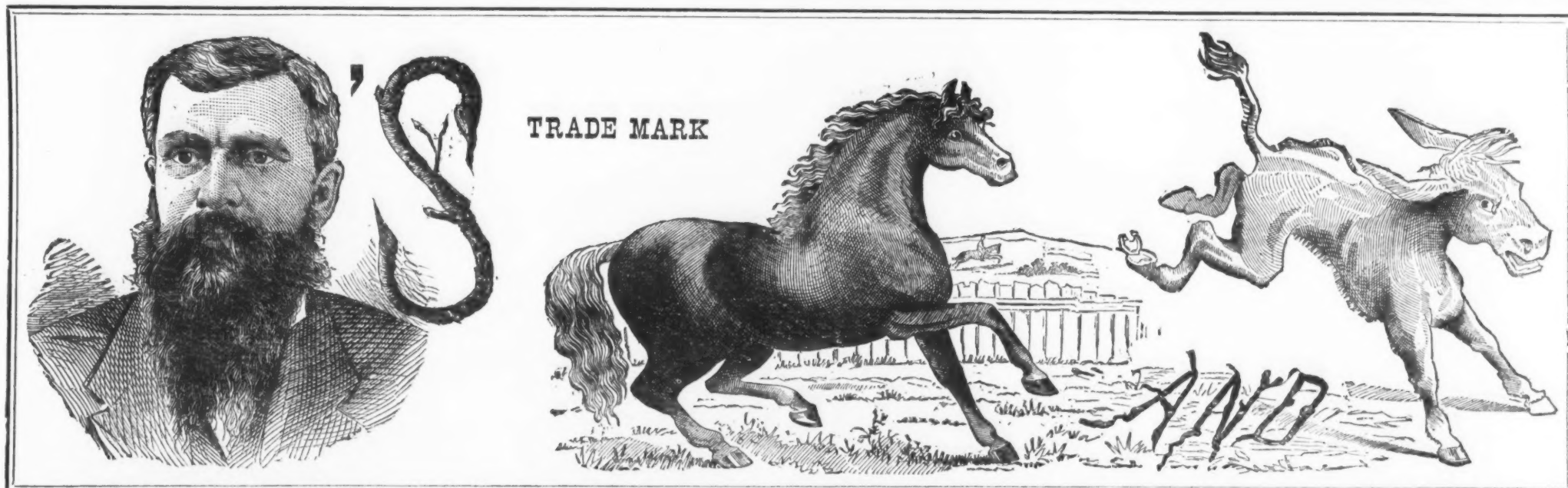
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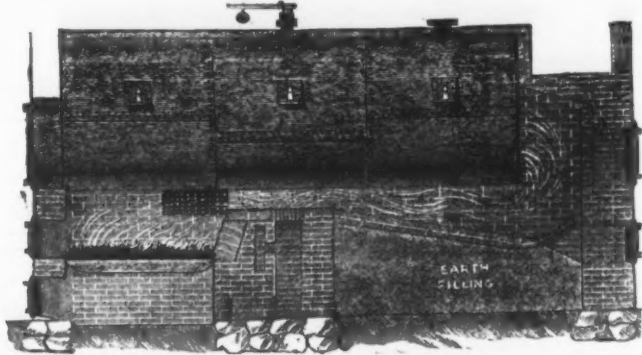
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Will Save its Cost in a Few Weeks.

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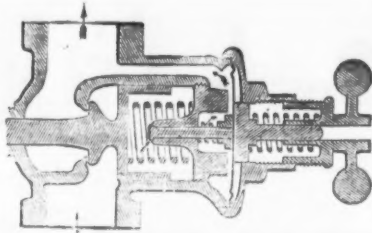
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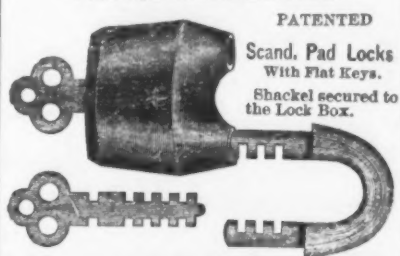
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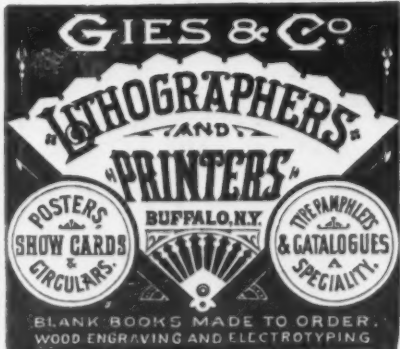
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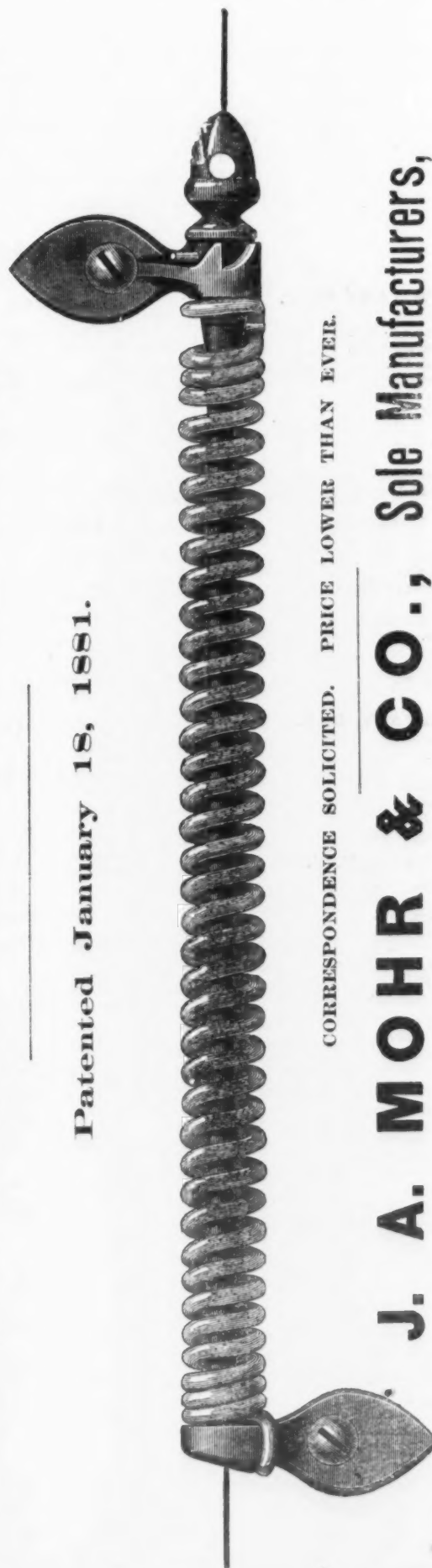
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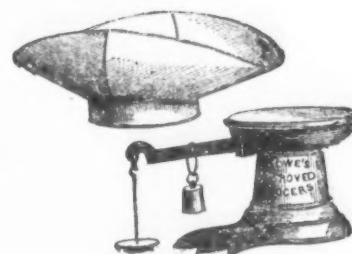
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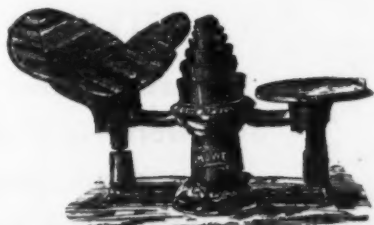
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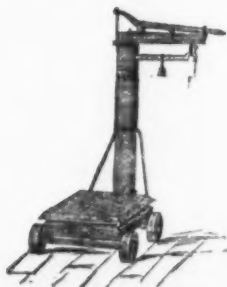


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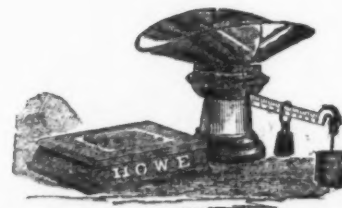


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Water Driven to any Height and Distance by Compressed Air.

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Mr. R. Newton—DEAR SIR: The Steam Trap we bought of you last August works admirably. Please send us another as soon as possible. Yours truly,  
JAMES B. SILER, Mech. Supt.

Clyde Bleachery and Print Works, River Point, R. I., January 17, 1881.  
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S. H. GREEN & SONS.

A. & W. Sprague Mfg. Co., Cranston Print Works, R. I., Jan. 15, 1880.  
Mr. Robert Newton—DEAR SIR: The Steam Traps we bought of you work first-class and give every satisfaction, and appear to be very durable. We think them the best Steam Trap that we have ever had. When in want of more will write you. I remain, yours, truly,  
THOMAS BRISTOW, Supt. Cranston Print Works.

Office of Washington Mills, Boston, December 24, 1880.  
Providence Steam Trap Co.—GENTLEMEN: Please forward to Washington Mills as soon as possible six (6) inch Traps and send bill to me.  
Yours truly,  
HENRY F. COE, Treas.

Kendall Manufacturing Co., Providence, R. I., Feb. 1, 1881.  
Providence Steam Trap Co.—GENTS: We have used one of your Steam Traps for some time and would say that we find it gives perfect satisfaction.  
Yours truly,  
NICHOLAS SHELDON, Treas.

Providence, R. I., December 18, 1880.  
Mr. Newton—DEAR SIR: We have your Steam Trap working satisfactorily, and can conscientiously recommend it to all. Yours, very truly,  
B. COLLINGHAM, Supt. Atlantic Mills.

ROBERT NEWTON, C. E. M. E., Inventor and Patentee, Providence, R. I.

### PATENT OSCILLATING FIRE BARS.

We wish also to call your attention to R. Newton's PATENT OSCILLATING FIRE BARS, which for durability, economy and application are acknowledged by all practical engineers that have seen them up to the present time to be the best ever brought before the public. This invention the patentee has labored at more or less since 1851. These bars have long been wanted, and their use will at once prove their efficacy as an economiser of fuel and labor. These bars can consume from four to twenty-six pounds of coal per square foot of grate, per hour, and not warp; and the apertures can be kept clean so that they can get a regular supply of oxygen, which is the life-giving power of calorific. They can be applied to all kinds of boiler surfaces (except vertical), and can be fitted to the furnaces in about five hours. Testimonials can be forwarded, if required, to show that they are now in use in some of the largest firms in the world.

**SOME OF THE ADVANTAGES:** These bars allow the use of inferior coal; evaporating power is greatly increased. This is a great boon where boiler power and space is limited. This advantage cannot be over-estimated in the case of marine boilers. The oscillating of the fire bars both cuts and lifts the slug, and clears the apertures at the same time. The bars give four motions in one oscillation, and cannot get out of order. They are also free of expansion and contraction, both longitudinal and transversal, and however careless the stoker may be he cannot leave them so as to take any harm. They are so cast, and of such metal, that they are the most durable bar ever brought into use. All now in use are very much approved. They are very simple and cannot get out of order. Their cost is so reasonable that they come within the reach of all. The company are now granting licenses to several firms to make and apply them, and are open to arrange with other parties. N. B.—The company furnish first sets of models.

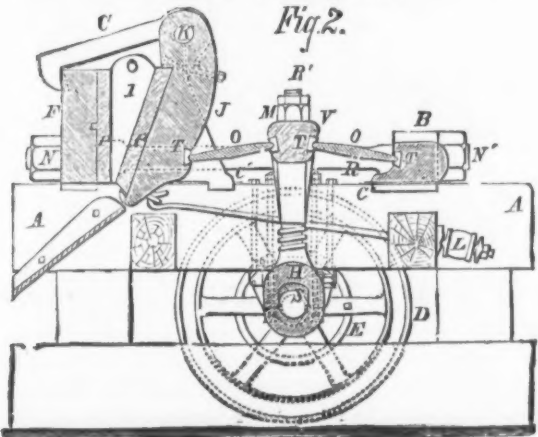
Agents wanted for different locations.

All communications should be addressed to PROVIDENCE STEAM TRAP CO., P. O. Box 1213, Providence, R. I.



## THE NEW BLAKE CRUSHER, OR, BLAKE'S CHALLENGE ROCK BREAKER.

Patented Nov. 18, 1879.



The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor. This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Awarded medals of superiority by judges of American Institute Fair, New York City, 1879 and 1880, where it was exhibited in competition with our old forms of Crusher. Address,

**BLAKE CRUSHER CO.,**  
Sole Makers,  
NEW HAVEN, CONN.



**G. A. CROSBY & CO.,**

259 & 261 Randolph St.,  
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**PRESSES,  
DIES,**

And Special Tools for Tin Can Makers and  
Sheet Metal Workers.

Send for Catalogue and Price List.

**E. C. ATKINS & CO.**



SPECIALTY:  
LARGE CIRCULAR SAWS.

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INDIANAPOLIS, IND.

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HYDRAULIC ELEVATOR COMPANY,**  
Offices, No. 1193 Broadway,  
NEW YORK.

Hydraulic Elevators for Passengers or Freight.  
Hydraulic Double-Acting Dumb Waiters. Hy-  
draulic Sidewalk Elevators. N. B.—Steam Eleva-  
tors altered to Hydraulic Elevators.



**THE DUPLEX INJECTOR.**

The Best Boiler Feeder  
Known.

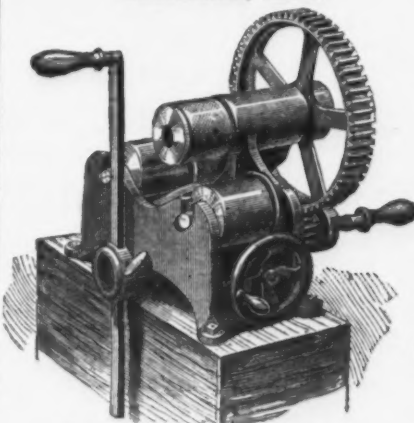


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16 & 18 Atwater St., East,  
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**STOVE REPAIRS.**

Repairs for Stoves made at Troy, Albany, Ro-  
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**WILEY & RUSSELL MFG. CO.,**  
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Agents in London, Eng., Messrs. SELIG, SONNENTHAL &amp; CO.

## DOUBLE ACTION RATCHET SCREW DRIVER.

ONE OF THE VERY BEST TOOLS EVER INVENTED.

It combines greater Strength, Convenience and Durability than was ever obtained in a Common  
Driver. Sells readily and gives Perfect Satisfaction.



Trade supplied by the principal Jobbers throughout the U. S. or by the manufacturers,

**GAY & PARSONS,** - - - Augusta, Maine.

SEND FOR PRICE LIST.

## HENLEY'S CHALLENGE ROLLER SKATE.

The Latest and Best.

Light Running, Durable.

A Complete Scientific  
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Patented Oct. 16, 1880; Aug. 23, 1881.

Liberal Terms to the Trade.

For prices and further particulars  
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**M. C. HENLEY,**

Patentee and Manufacturer,

309 North 14th St.,

RICHMOND, IND.



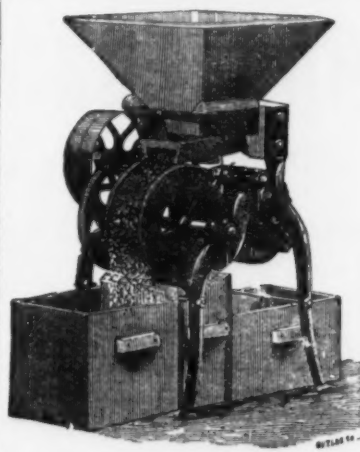
## B. FITTS' PATENT MAGNETIC METAL SEPARATOR.

MAGNETIC METAL SEPARATOR.

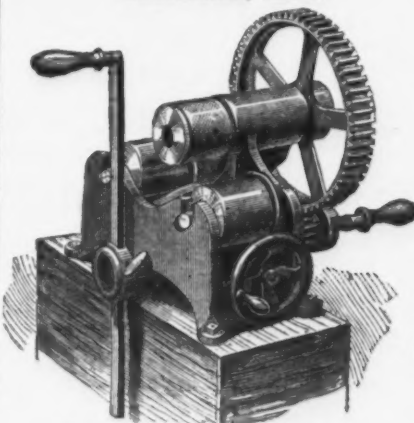
The accompanying cut represents a view of a recently invented machine for separating iron turn-  
ings, filings, &c., from brass, composition and other material.  
Its capacity and utility for this kind of work surpasses anything ever before offered to the public,  
doing its work most thoroughly, and with the least amount of labor or trouble. The machine is not  
only a great labor-saving device, but brass stock treated with it is much improved, as it is thoroughly  
cleaned that it may be used for the best of work.  
The machine may also be used for separating iron from emery.

TESTIMONIALS.

From the Wakefield Manufacturing Co., Boston.  
BOSTON, Jan. 18, 1879.  
Mr. Ezra Sawyer, Worcester: Of the many methods  
we have practiced in separating iron from brass  
turnings and filings, we have found none equal to  
your machine. Very truly yours,  
E. C. HAMMER, Treas.  
From the Benedict and Burham Mfg. Company,  
Waterbury, Conn.  
WATERBURY, CONN., Aug. 19, 1879.  
Ezra Sawyer, Esq., Worcester:—DEAR SIR: We hand  
you check for Metal Separator. It appears to do the  
work very well, and is quite a saving of labor over the  
old process of cleaning our washings, and metal hav-  
ing iron in the same. Yours, &c.  
CHAS. BENEDICT.  
From Union Water Meter Company, Worcester.  
We have used one of B. Fitts' Patent Magnetic Metal  
Separators for eighteen months, and can recommend  
it as the best thing we have ever seen for separating  
metals, and have no doubt it has more than paid for  
itself in its use. UNION WATER METER CO.  
WORCESTER, Sept. 1, 1879. J. C. OTIS, Treas.  
Manufactured by  
EZRA SAWYER, 33 Hermon Street, WORCESTER, MASS.

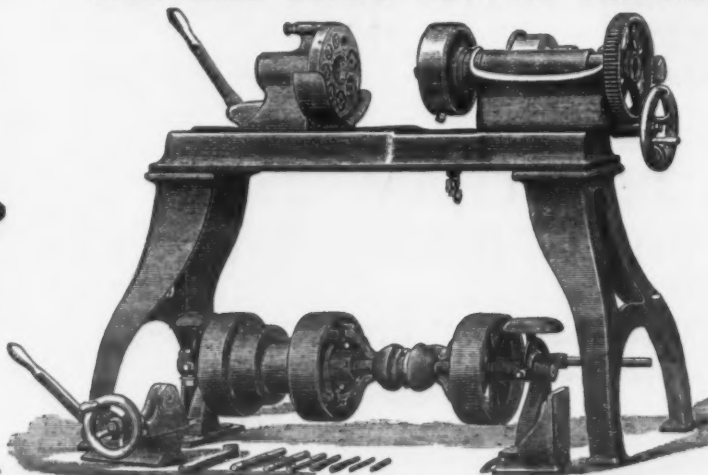


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**Armstrong's Improved Adjustable Stock and Dies**  
FOR PIPE AND BOLTS.



Tapped to the U. S. and Whitworth Standard Gauges. Adjustable to all variations in the size of  
fittings. Can be resharpened without drawing the temper by simply grinding them. Possessing prac-  
tical advantages appreciated by all mechanics. Circular and Price List sent free on application.  
Manufactured by F. ARMSTRONG, 30 Sterling St., Bridgeport, Conn.



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MANUFACTURERS OF THE

No. 00 and 000 Patent Swing Socket Snaths.  
SPRINGFIELD, VERMONT.

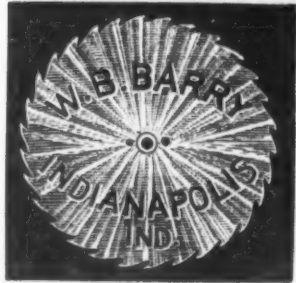
Represented in New York by LAMSON &amp; GOODNOW MFG. CO.







# HOOSIER SAW WORKS.



W. B. BARRY, Indianapolis, Ind.  
**Circular Saws.**

I use none but best refined cast steel, selected. All saws subjected to a careful examination before shipment.  
A trial of our goods will satisfy the purchaser of their excellence.  
Send for catalogue.

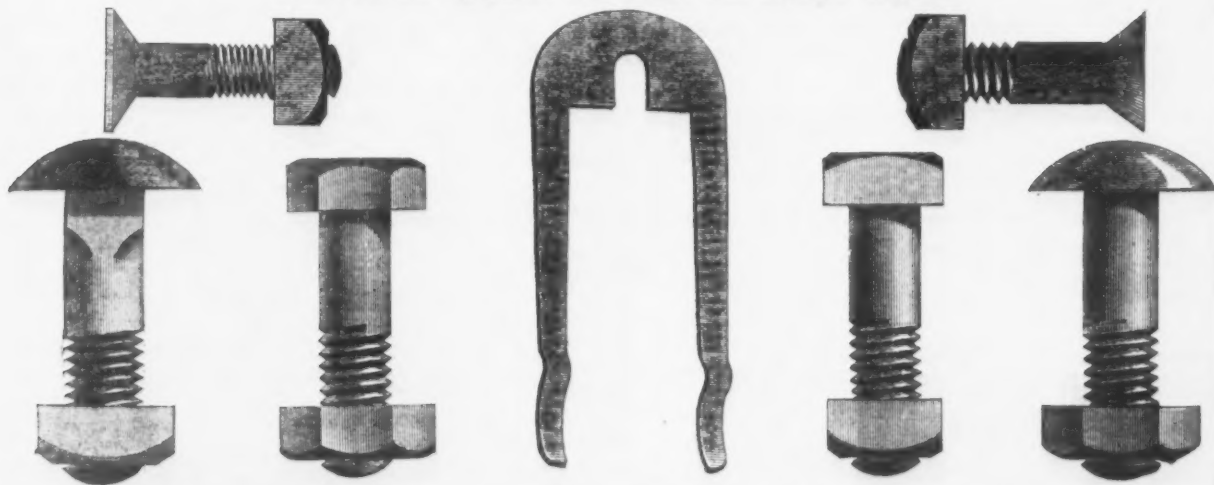


**WILLIAM H. HASKELL & CO.,**  
MANUFACTURERS OF  
**BOLTS & COACH SCREWS**

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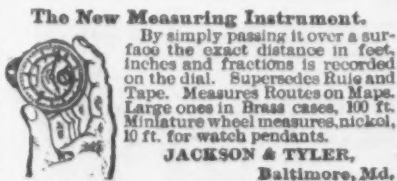
HENRY B. NEWHALL, 105 Chambers St., New York Agent.  
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**Patent Steel Tube and Flue Brush.**

Best in the market.  
Made any size required.  
Combines the properties of a  
Scraper and Brush.  
Full stock always on hand.

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**The New Measuring Instrument.**

By simply passing it over a surface the exact distance in feet, inches and fractions is recorded on the dial. Supersedes Rule and Tape. Measures Routes on Maps. Large ones in Brass cases, 100 ft. Miniature wheel measures nickel, 10 ft. for watch pendants.  
JACKSON & TYLER,  
Baltimore, Md.

Established  
1855.

**KEYSTONE WORKS.**

Centennial Award  
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**GEORGE GRIFFITHS,**

MANUFACTURER OF

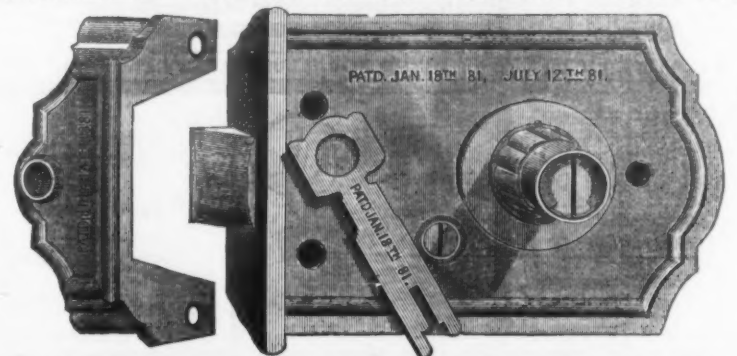


**Shovels, Spades, Scoops,  
Coal Hods, &c.,**

Nos. 511, 513 and 515 LOCUST ST.,  
PHILADELPHIA, PA., U. S. A.

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**BARNES' NEW RIM NIGHT LATCH.**



H. F. SISE, Sole Agent, 100 Chambers St., New York.

**THE FRENTRESS STEEL**

**BARB WIRE**

Patented Dec. 14, 1875.

Reissued May 2, 1877.



The most popular Barb Fence Wire now offered in market, at prices which cannot be undersold. Send for Price Lists and Circulars.

MANUFACTURED BY THE  
**ST. LOUIS WIRE FENCE CO.,** | **The Frentress Barb Wire Fence Co.**  
814 & 816 N. Second St., St. Louis, Mo. East Dubuque, Illinois.

**The Farrel Foundry and Machine Co.**

ANSONIA, CONN.,

Manufacture Improved

**ROCK & ORE  
BREAKERS,**

(THE "BLAKE" STYLE),  
designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores; also, Stone for making Concrete and Railroad Ballast.

View of Rock Breaker. Twenty years of practical test, at Home and Abroad, has proven this machine to be the best one ever invented for the purpose. Mr. S. L. MANDEL, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable circuit. Chilled Rolls and Rolling Mill Machinery; Power Presses, single and double acting; also, Hammers, Drops and Lifters; Shafting, Pulleys and Hangers.  
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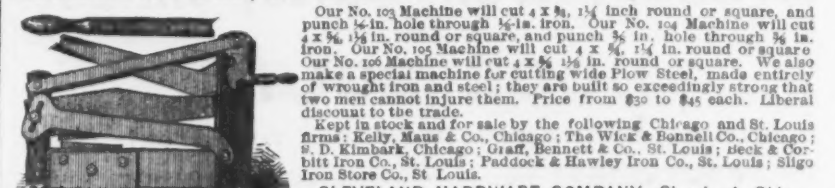
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Standard, Acme and Domestic Egg Beaters.

Also, Housefurnishing Goods generally. Circulars and samples on application.  
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Patent Hand Iron Cutter, with and without Punch Attachment, for Iron & Steel.



Our No. 102 Machine will cut 4 x 8, 1 1/2 inch round or square, and punch 1/2 in. hole through 1/2 in. iron. Our No. 104 Machine will cut 4 x 8, 1 1/2 in. round or square, and punch 3/4 in. hole through 1/2 in. iron. Our No. 106 Machine will cut 4 x 8, 1 1/2 in. round or square. Our No. 108 Machine will cut 4 x 8, 1 1/2 in. round or square. We also make a special machine for cutting wide Flaw Steel, made entirely of wrought iron and steel; they are built so exceedingly strong that two men cannot injure them. Price from \$30 to \$45 each. Liberal discount to the trade.  
Kept in stock and for sale by the following Chicago and St. Louis firms: Kelly, Maus & Co., Chicago; The Wick & Bennett Co., Chicago; J. D. Kimbark, Chicago; Graft, Bennett & Co., St. Louis; Beck & Corbit Iron Co., St. Louis; Faddock & Hawley Iron Co., St. Louis; Sligo Iron Store Co., St. Louis.  
CLEVELAND HARDWARE COMPANY, Cleveland, Ohio,  
Manufacturers of WAGON HARDWARE.

**JAMESTOWN AX AND EDGE TOOL CO.,**

Manufacturers of

**AXES, PICKS, MATTOCKS, &c.**

Are prepared to manufacture Axes of any special shape or style to suit their trade, and will guarantee the same equal in every respect to any goods made in the country.  
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Special Figures given for spring orders.

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WYOMING, LUZERNE COUNTY, PA.

Patent Plain Back Solid Shovels and Spades, Back Strap Shovels, Spades and Scoops.

RAILROAD AND MINERS' SHOVELS of Superior Quality a Specialty.

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**PAYNE PETTEBONE & SON.**



# DE-OXYDIZED BRONZE.

**DE-OXYDIZED BRONZE** (patented) is an alloy of **LAKE COPPER** and best **ASIATIC TIN** in any proportion required, so as to be either as ductile as copper, as tough as iron, or as hard as steel, according to the proportion of Copper and Tin used.

The process of making the alloy is what constitutes its superiority over any other known alloy of Copper and Tin or any other Bronze composition. The castings made from this metal, owing to its perfect fluidity when melted, possess great density, perfect soundness and homogeneity. Unlike certain bronze and other compositions, it can be handled without the least difficulty by any ordinary founder, as it flows like oil in pouring.

Thus the necessity and trouble of shipping patterns, the delay in receiving castings and the expense of the double charges of freight or express, such as attend the obtaining, in many cases, of Phosphor Bronze, are entirely avoided by ordering **D. O. B. in ingots**. Where this metal has superseded other compositions of similar character, it has endured three times as long. In a word, we claim that **De-Oxydized Bronze** not only has none of the objectionable features attributed to similar compositions, but that it possesses all their good qualities in addition to its own merits, and advantages peculiar to itself, such as the following summary will make clear:

1. **ITS GREAT CONVENIENCE IN HANDLING** as compared to Phosphor Bronze.
2. We claim for it **SUPERIOR ANTI-FRICTION QUALITIES** to any other known Brass or Bronze.
3. **GREAT MALLEABILITY AND TENACITY.**
4. Its homogeneousness and smoothness of surface render it capable of the **HICHEST POLISH.**
5. As before mentioned, we claim for it **UNEQUALED ENDURANCE.**
6. We claim that **JOURNALS MADE of D. O. B. REQUIRE ONE-FOURTH LESS LUBRICATING MATERIAL** than any other composition yet known.

Finally, this metal has never failed to give more than satisfaction wherever used. To sustain our statements, the following testimonials will suffice:

**Henry Disston & Sons, Saw, Tool, Steel and File Works, Front and Laurel Streets, Philadelphia Smelting Company, City:**

PHILADELPHIA, October 4, 1879.

GENTLEMEN: After a trial of eighteen months of your "DE-OXYDIZED BRONZE" as Journal Boxes in our Rolling Mill, where great pressure is required we take pleasure in recommending it as being superior to any we have heretofore used. Very truly,

Office of Eagle Iron Works, 1162 North Third Street,

Philadelphia Smelting Company:

PHILADELPHIA, August 29, 1879.

GENTLEMEN: In reply to yours of the 28th inst., we beg to say that we have been using your "DE-OXYDIZED BRONZE" for over a year, and have found it better than any composition boxes we have used; and as long as

you continue to make it the same quality, we shall use no other metal in our Engine Boxes. We therefore take pleasure in recommending it to Engine Builders in general.

Yours respectfully,

HOFF, FONTAINE & ABBOTT.

Office of Union Brass Manufacturing Company,

CHICAGO, Dec. 23, 1880.

Philadelphia Smelting Company, Limited, Twelfth and Noble Streets, Philadelphia, Pa.

DEAR SIR: In reply to your inquiry of yesterday as to our opinion of "DE-OXYDIZED BRONZE" for Railway Coach Trimmings, I beg to submit that we have used it up to present writing for the trimming of something over 100 coaches. One marked peculiarity of this metal, when highly finished, is non-liability to abrasion, and its non-affinity with the gases of the atmosphere, which in embossed work is a great desideratum. To those willing to pay more in the first cost, we would confidently recommend "DE-OXYDIZED BRONZE" Trimmings as cheaper in the end.

Yours very truly,

J. HALL DOW, President.

This metal is used for the following purposes, and we can refer to large concerns in addition to above, through the New England and Middle and Western States, who are using it in preference to any other.

1. **Engine, Car and Machinery Journals.**
2. **Pumps, Valves and Linings, Cylinders, Pinions, Cogs, Plungers, Crank Pins, &c.**
3. **Car Trimmings, Harness and Coach Furniture, House Hardware, Steam Fittings, &c.**
4. **Wire, Sheets, Rods and Tubes.**

And for any other purpose that a handsome, durable and sound Bronze is required. We especially commend it to **Railroad Companies, Car Builders, Machinists, Engineers** and others requiring a **Journal Metal** that will stand the severest friction and the heaviest pressure.

Manufactured and for sale in Ingots and Castings by the

**PHILADELPHIA SMELTING COMPANY, Limited,**

S. E. COR. TWELFTH AND NOBLE STS., PHILADELPHIA, PA., U. S. A.

## GENUINE BABBITT.

Our Genuine Babbitt is superior to all other makes in the market in every particular. We guarantee it to be perfect in its Anti-Friction qualities in machinery **AT A SPEED OF 10,000 PER MINUTE**, or at **1000 TONS PRESSURE** for **10 YEARS**. We append below testimonials from A1 houses justifying us in the above claims.

WORCESTER, MASS., April 21, 1881.  
We have used your "Genuine Babbitt" about 4 years on our wood cutting machinery bearings, run at a speed of 9800 revolutions per minute, and all ways with entire satisfaction.  
G. W. INGALLS & CO.

NEW HAVEN, CONN., April 11, 1881.  
We have used your "Genuine Babbitt" in our Challenge Rock Breaker with excellent results, and are pleased to testify to its merits for Journals.

where high speed and great pressure are required.

BLAKE CRUSHER CO.

Office JAMES BUTTERWORTH & SON, Manufacturers of Woolen Machinery, 258, 264 and 266 E. Adams St. PHILA., Oct. 27, 1881.  
PHILADELPHIA SMELTING COMPANY.—Gentlemen: We have been running your "Genuine Babbitt" on our wood drilling machine for the last eight years at a speed of 5000 revolutions per minute, without renewal. We have found it to be the best metal we ever used. Yours truly,  
JAMES BUTTERWORTH & SON.

WORCESTER, MASS., April 23, 1881.

Having used your "Genuine Babbitt Metal" for over 4 years on machinery that runs over 9000 turns a minute, on 1 in. shaft, 3 in. journals, I can safely recommend it for all you advertise it to do. Any person wishing to see the machinery or wanting further information can call or address,

A. I. THOMPSON, Master Mechanic, 25 Hermon street.

From J. L. MARSDEN, Supt., FARRELL FOUNDRY AND MACHINE CO., ANSONIA, CONN., Aug. 17, 1880.

The "Genuine Babbitt" we have bought from you gives perfect satisfaction in our Stone Breakers. We have it working in bearings 12 in. long and 5 in. diameter. One-half the revolution of shaft there is a pressure of 900 tons. The other half 2 1/4 tone. The shaft makes from 200 to 250 turns per minute. I think this is a very severe test, yet they have been running for more than one year.

From WITHERBY, RUGG & RICHARDSON, Manufacturers of Wood-Working Machinery, WORCESTER, MASS., Nov. 24, 1880.  
Send us 1000 pounds "Genuine Babbitt," divided into Bars, as usual. We think the continuance of our trade with you, in the face of the constant effort made by other parties to divert our patronage, is a sufficient recommendation of your goods. We speed some journals as high as 6000.  
Yours truly,  
WITHERBY, RUGG & RICHARDSON.

From this it will be seen that it can have no superior, or even equal, as an Anti-Friction Metal in anything manufactured. We make besides all grades of Anti-Friction Metals,

Letter A, Guaranteed at a speed of 2000.  
Letter D, Used for Shafting.

Letter B, Guaranteed at a speed of 1000.  
Letter E, Used for Ag'l Implements' &c.

Letter C, Guaranteed at a speed of 800.  
Letter A L, For slow speed.

All our Metals are made from best Lake Copper, Asiatic Tin, Cookson's Antimony and best Refined Lead, and in all cases run free at melting heat, without drossing, and without any necessity for heating the journals into which they are poured.

## MANUFACTURERS' AND MACHINISTS' NAME PLATES, REAL BRONZE, FINISHED.

Patterns from \$3 upwards, according to Size and Style. Plates, \$3 per dozen and upward, according to Size and Style.

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We have a specialty in this line and produce a handsomer plate, at less money, than can be obtained elsewhere.

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GAS FIXTURES, ALTAR CANDLESTICKS, SANCTUARY LAMPS, CHANCEL RAILS, PULPITS, &c.

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## Steel Wire

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For All Purposes.

**Special Finest CAST STEEL WIRE,**  
MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND  
UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET,  
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ALL KINDS OF FURNITURE SPRINGS.

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WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,  
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Manufacturers of

# CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &amp;c.

Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in quality, finish and accuracy.

Also Common Grades.

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DOG BRAND" FILES.

Also of superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &amp;c.

COLD ROLLED STEEL for Clock Springs, Corsets, &amp;c.

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Near John Street.



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Manufacturers of the Celebrated

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**STEEL.**

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,  
Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

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WILLIAM BROWN, Representative.

**Cleveland Rolling Mill Co.,**  
Manufacturers of

BESSEMER STEEL

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Iron Rail and Fastenings,

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WIRE OF ALL KINDS,

Tire, Axles and other Forgings,  
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Siding of Siemens-Martin, Bessemer Steel and Iron.

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**THE MIDVALE STEEL CO.,**  
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Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,  
Extra Mild Center Steel, special for Taps;

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

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Address A. M. F. Watson, General Sales Agent.

**STEEL** Gautier Steel.  
See Page 3.

Steel.

**NEWARK STEEL WORKS.**  
BENJAMIN ATHA & CO.,

Manufacturers

# BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS

A full assortment of this universally approved OLD BRAND and other Steels for sale by

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LABELLE STEEL WORKS.

**SMITH, SUTTON & CO.,**  
MANUFACTURERS OF ALL KINDS OF

# STEEL.

Also Springs, Axles, Rake Teeth, &amp;c.

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ALL WEIGHTS.

The Company warrant its Rails equal in quality to any manufactured in the United States.

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**GUTE HOFFNUNG'S HUTTE,**  
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Established 1781.

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8500 men employed.

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STEEL RAILS,

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SPIEGELEISEN,

FERROMANGANESE UP TO 80 PER CENT.

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Special Steel

FOR

**LATHES, PLANERS, &c.**

Turns out at least double work by increased speed  
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**STEEL COMPRESSED SHAFING,**  
"Benzon" Homogeneous Plates

For Rollers, Fire-boxes, &amp;c.

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**Iron and Steel Merchants**  
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Iron and Steel Rails, Blooms, Spiegeleisen,  
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and all kinds of Railway Plants.

Engines and Piping for Water-

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The Most Durable and Best Selling  
**Bucket for Chain Pumps.**

It has no valves to become obstructed and no screw  
joints to become immovable by rust.  
Advantages of the Crosby Bucket over all others—  
1. It has an air chamber on top, which conducts the air  
to the bottom of the well. 2. It is self-expanding, the  
bottom of the bucket being 1/4 of an inch larger at the  
bottom than the hole in the tubes, which allows it to  
expand, and the  
groove in the side to  
contract. 3. The  
wear comes on the  
white side, and not  
on the extreme edge  
like other buckets.  
4. It contains more  
solid rubber than  
three of any other  
manufacture.  
Three sizes—14  
inch for deep wells,  
1 1/2 inch for 4 feet  
or less, 2 inch for  
stock pumps.  
No change for Ter-  
ritorial Rig ts.  
NONE GENUINE  
unless A. D. Crosby  
appears in raised  
letters on base of  
each bucket.  
Send for Price List. Agents wanted in every  
county. Address A. D. Crosby, Patentee and General  
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E. D. Douglas, 3 and 5 John St., N. Y., and all General  
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Metal Spinning.

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Bridge Iron, Iron Beams, Channel Bars, Car Truck Channels, Angles, Tees,  
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Special attention given Unusual Shapes and Sizes.

Lithographs of sections and book of detailed information giving calculation of strain, &c., furnished  
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CAPITAL, \$5,000,000.

INCORPORATED 1869.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

MERCHANT BAR, FISH PLATES, PIG METAL,  
IRON RAILS & BESSEMER STEEL RAILS.

Present Annual Capacity of these Works.	Fish Plates.....	Merchant Bar.....	Pig Metal.....	Iron Rails.....	Steel Rails.....	Total Capacity per year.....
	15,000 tons	10,000 "	10,000 "	10,000 "	10,000 "	55,000 "

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BLOOMS, FLAT BAR,  
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Steel for Agricultural and other Purposes.

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Of Steel and Iron, up to 30 inches wide, and of any desired thickness and length.

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FREY &amp; BROOME, Manufacturers of

HEAVY AND LIGHT BRASS CASTINGS. CAR BRASSES AND RABBIT METAL A SPECIALTY.  
Send for prices. HIGHEST PRICE PAID FOR OLD BRASSES.

## THE "WARNER" DOOR SPRINGS

are the most simple, most effective and most convenient ever introduced, and the immense sale we  
are having shows their great popularity and superiority.There never was a Spring made that is so durable, so complete in its action, operating with a  
uniform pressure, holding the door tight when closed, and allowing it to open without increasing  
the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also  
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This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

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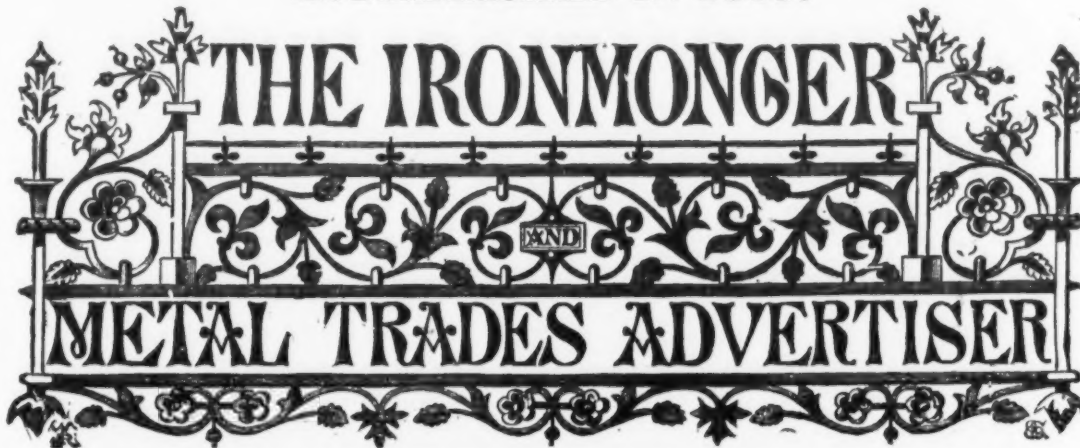
They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

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FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

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and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities  
for acquiring information specially suited for the columns of the Ironmonger. The Weekly, Legal Notes, Trade Notes, Bankruptcies, Foreign  
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to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French,  
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It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to  
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tional value for advertisements. Sold to non-subscribers at 75 cents.

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With which is incorporated The Universal Engineer,

is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication for the  
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FEBRUARY 25, MARCH 25, APRIL 25, MAY 20, JUNE 27, JULY 8, AUGUST 5, SEPTEMBER 2 and 30, OCTOBER 28, NOVEMBER 25, DECEMBER  
23, 1882, and JANUARY 30, 1883.

This Supplement is published in

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of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach  
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## THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List of advertise-  
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BEST AND CHEAPEST.  
Established 1845.  
Office, foot of Houston Street, East River,  
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**NEWTON & CO.,**

ALBANY, N. Y., Manufacturers of

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**Stove Linings,**

**Range and Heater Linings**

Cylinder Brick, &c., &c.

English, Scotch and Welsh

**FIRE BRICKS,**  
Dinas and Silica Bricks  
for Glass and Steel Works.

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40 and 42 Broadway, New York.  
Yard foot of 4th St., Hoboken, N. J.

**M. D. Valentine & Bro**  
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**FIRE BRICK**  
**And Furnace Blocks**  
**DRAIN PIPE & LAND TILE.**  
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**BORGNER & O'BRIEN,**

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**FIRE BRICK**

Edge Pressed Furnace Blocks,  
**CLAY RETORTS, TILES, &c.,**  
Twenty-third Street,  
Abby's Race, PHILADELPHIA.  
Twenty years' practical Experience.

**WATSON FIRE BRICK CO.,**  
ESTABLISHED 1856.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey  
Manufacturers of

**FIRE BRICK,**

OR ROLLING MILLS, BLAST FURNACES, POUN-  
DRING GAS WORKS, LIME KILNS, TANNERIES,  
BOILER and GRATE SETTING, GLASS WORKS, &c.  
Fire Clays, Fire Sand, and Kaolin for Sale.

**HENRY MAURER,**  
Proprietor of the  
**Excelsior Fire Brick & Clay**  
**Retort Works,**

Manufacturer of FIRE BRICK, HOLLOW  
BRICK AND CLAY RETORTS.  
WORKS: PERTH AMBOY, NEW JERSEY.  
Office & Depot 418 to 422 East 23d St., N. Y.

**TROY FIRE BRICK WORKS,**  
Troy, N. Y.,  
**JAMES OSTRANDER & SON,**  
ESTABLISHED 1848,  
Manufacturers of

**FIRE BRICK,**

Towers, Tiles, Blast Furnace Blocks, &c. Miners and  
builders: Woodbridge Fire Clay and Sand, and Staten  
Island Kaolin.

Established 1864.

**GARDNER BROTHERS,**

Manufacturers of

**STANDARD SAVAGE FIRE BRICK,**  
**TILE & FURNACE BLOCKS,**

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and  
Miners and Shippers of Fire Clay.  
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WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

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**FIRE BRICK,**

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**CHAS. D. COLSON,**

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Foundry Facings, Sand, Tools and Supplies.  
CHICAGO, ILL.

**UNION MINING COMPANY.**

**Mount Savage Fire Brick.**

**EDWARD J. ETTING, Agent,**  
230 South Third St., Philadelphia, Pa.

**DENNIS & CO.,**

Manufacturers and Dealers in

**INLAID FLOOR,**  
**WOOD CARPETING,**  
**WEATHER STRIPS,**  
**WIRE SCREENS and MOULDINGS.**  
167 Madison Street, CHICAGO.  
Factory, 337 and 339 W. Lake Street.

# HENRY DISSTON & SONS,

**KEYSTONE SAW, TOOL, STEEL & FILE WORKS,**

Front and Laurel Streets,

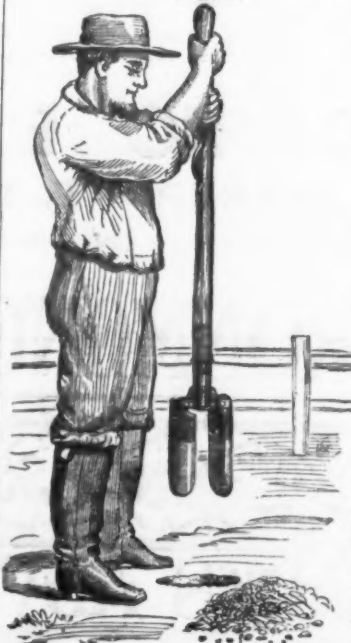
PHILADELPHIA.

**DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.**

Fig. 1.

Patented May 29, 1870.

Fig. 2.



Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad  
or Telegraph Company  
**SHOULD BE WITHOUT ONE.**

**NO BACK-ACHE.**

**NO KNEE-WORK.**

**NO CLOGGING.**

This tool has been thoroughly tested, and has given  
the greatest satisfaction to all who have tried it. The  
principle on which it works makes it self-cleaning and  
prevents adhesion in sticky soil; therefore it always  
works free and easy. It is far superior to all plungers,  
augers and boring machines, as it works well in stony,  
sandy, or clay soils; quicksand under water is as easily  
removed as though no water existed.

**DIRECTIONS.**

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown  
in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one  
hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply  
pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another  
plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

**HENRY DISSTON & SONS.**

## BROWER & LEEDS,

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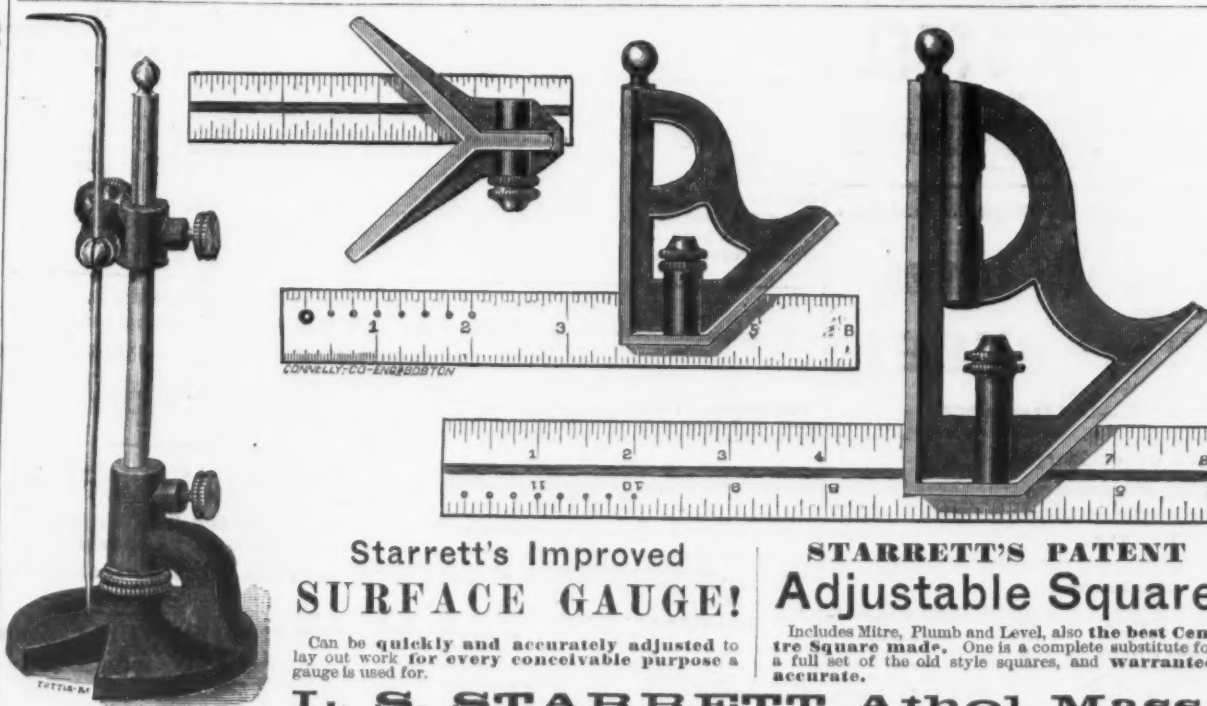
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**HORSE SHOES, HORSE NAILS, TOE CALKS, CALKING STEEL,**

**Bayliss' Bellows, Forges and Tuyeres,**

**Horseshoers' Pincers, Sledges,**

**FITTING AND DRIVING HAMMERS,**



**Starrett's Improved**  
**SURFACE GAUGE!**

Can be quickly and accurately adjusted to  
lay out work for every conceivable purpose a  
gauge is used for.

**STARRETT'S PATENT**  
**Adjustable Square**

Includes Mitre, Plumb and Level, also the best Cen-  
tre Square made. One is a complete substitute for  
a full set of the old style squares, and warranted  
accurate.

**L. S. STARRETT, Athol, Mass.**  
PATENTEE AND SOLE MANUFACTURER.

Send for Catalogue.

FRASSE & CO., Agents (P. O. Box 879), 62 Chatham St., New York.

**CAUTION.**

This is to inform the public that since the success of my Patent Squares has become known, unprincipled parties have had the  
foolhardiness to make them, under the Pretext of Chaplin's Patent. Having commenced suit against said parties, I shall  
soon put a stop to their manufacture, and shall hold all selling or using them responsible. Respectfully,  
**L. S. STARRETT.**

**R. P. SCOTT & CO.,**  
28 Orange Street, Newark, New Jersey,  
Manufacturers of  
ROTARY KNIFE PEACH PARERS, GOLD MEDAL APPLE  
PARERS, SAFETY REVERSIBLE ICE CREEPERS, EGG  
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Coil, Cable, Crane, and  
Agricultural Chains.

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Pure White Lead, Red Lead, Litharge,  
Orange Mineral, Linseed Oil,  
AND PAINTERS' COLORS.

**Brooklyn White Lead Co.**



**White Lead, Red Lead & Litharge.**  
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**JOHN JEWETT & SONS**  
Manufacturers of the well-known brand of  
**WHITE LEAD.**



ALSO MANUFACTURERS OF  
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**The Atlantic White Lead and**  
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Manufacturers of  
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**LINSEED OIL,**  
Raw, Refined and Balled.  
**ROBERT COLCATE & CO.,**  
287 Pearl St., NEW YORK.



**R. Onderdonk,**  
Sole Manufacturer of  
**LEVER LEMON**  
**SQUEEZER,**  
With Perforated Strainer.  
405 Grand St.,  
NEW YORK.

Price \$12.00.

Liberal discount to the trade.

Send for Circular.

Manufactured by

**CLARK SINTZ,**

Springfield, Ohio.

**HOWARD IRON WORKS,**

BUFFALO, N. Y.,

Manufacturers of

**BENCH VISES,**

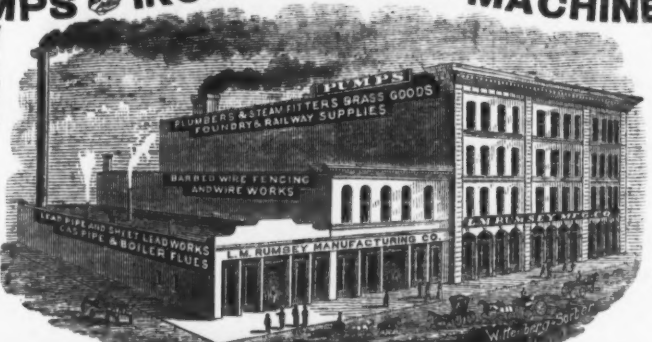
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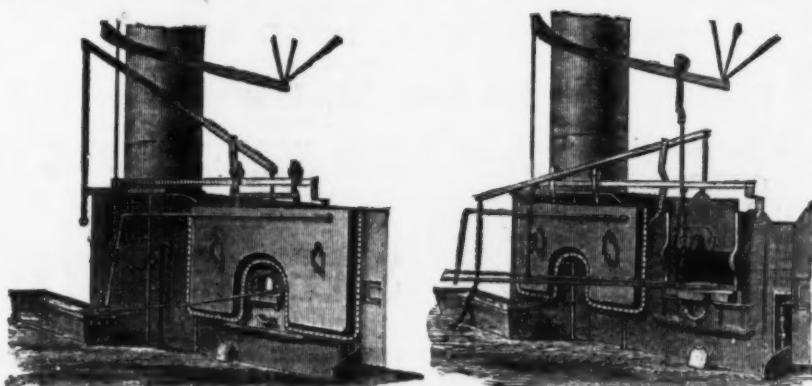
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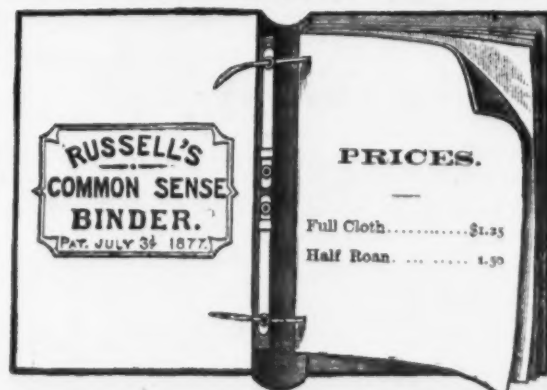
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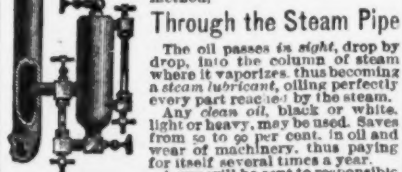
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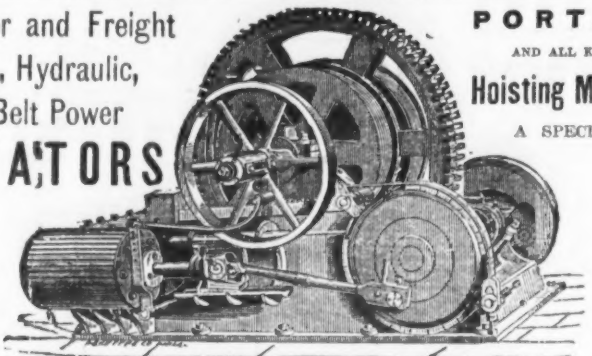
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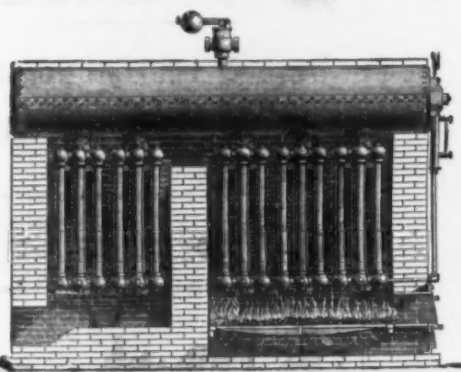
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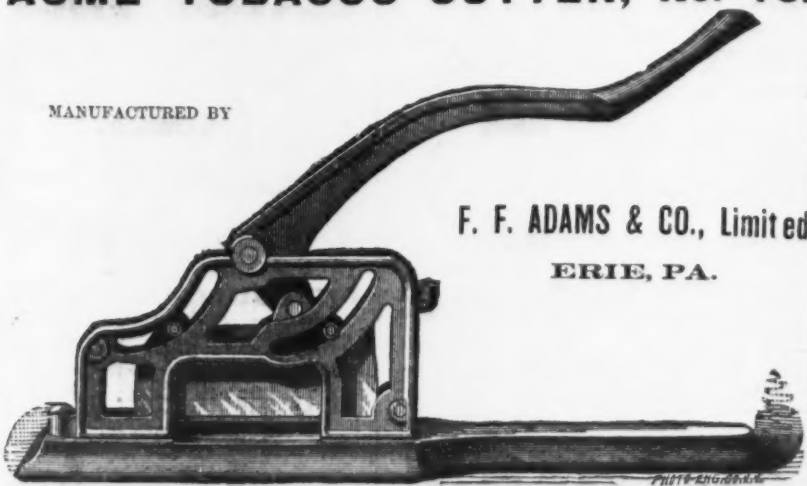
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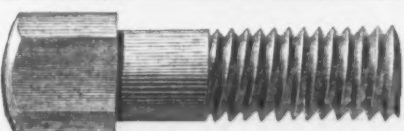
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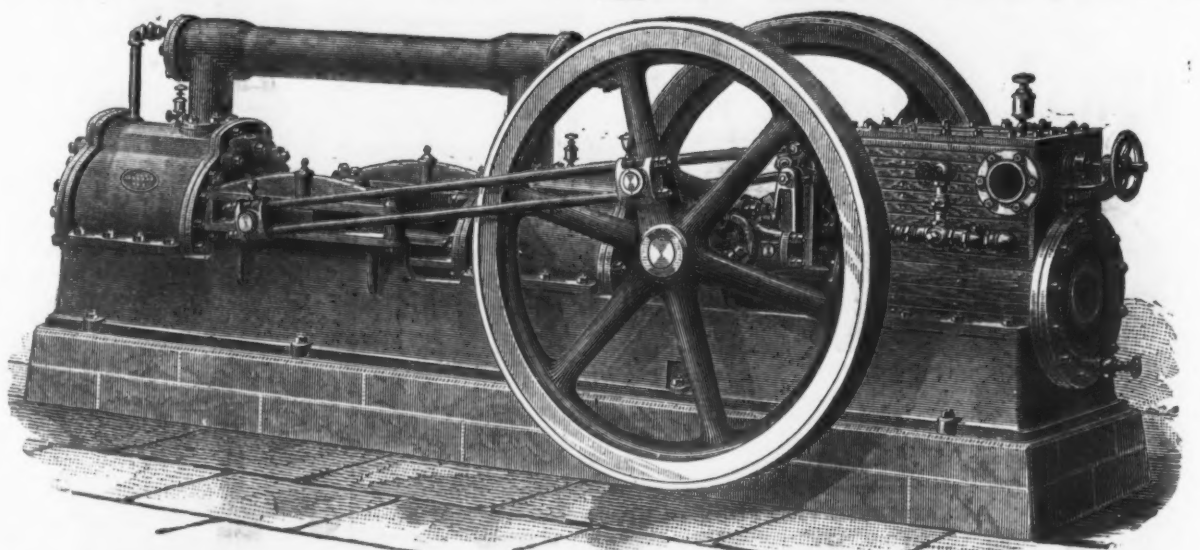
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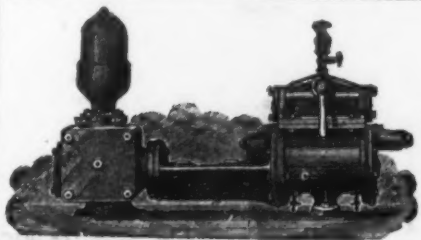
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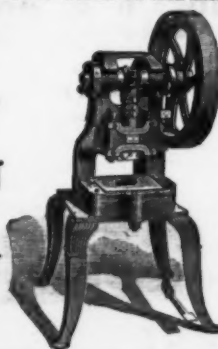
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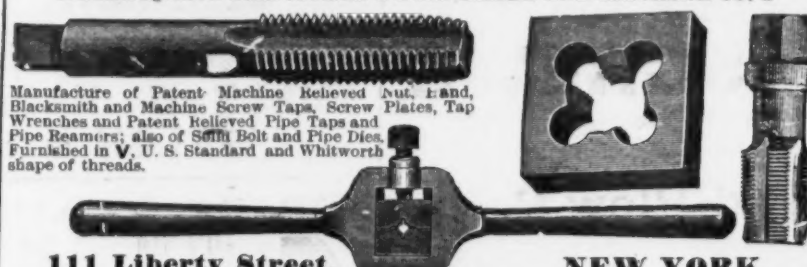
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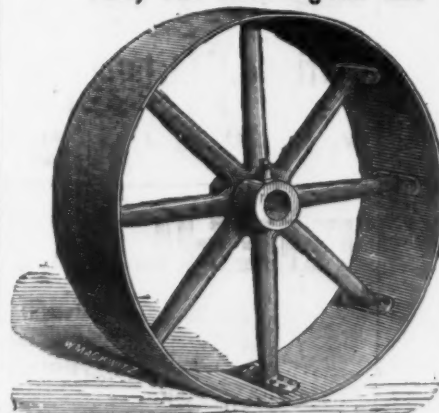


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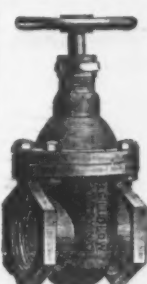
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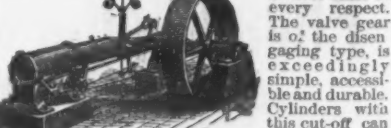
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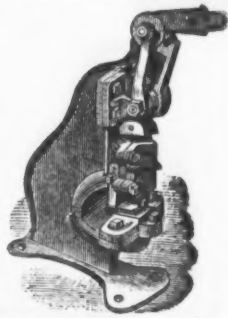


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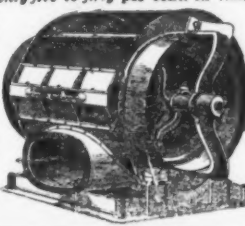
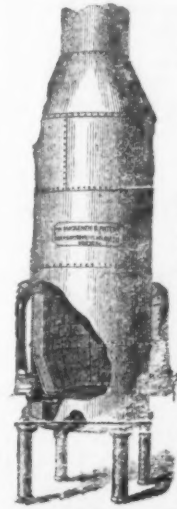
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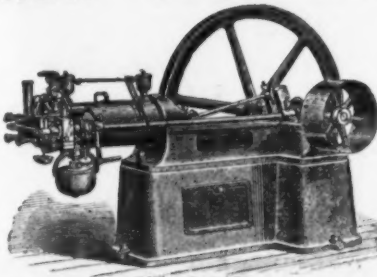
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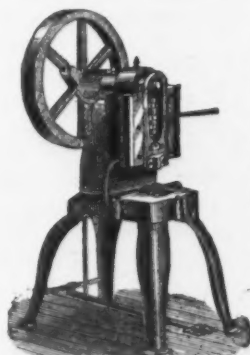
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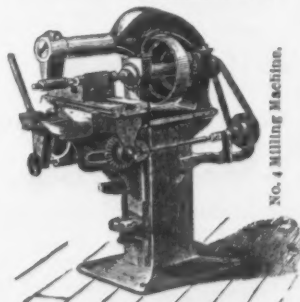
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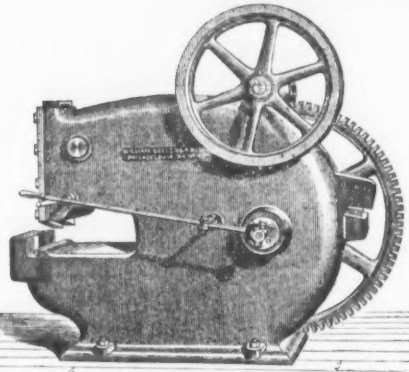
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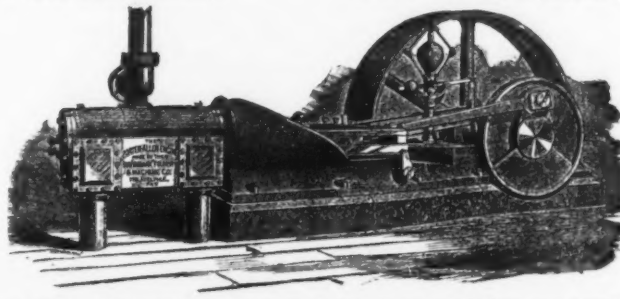
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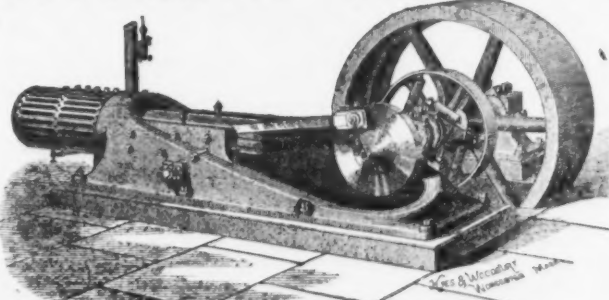
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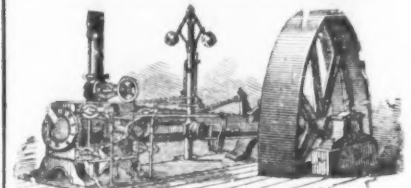
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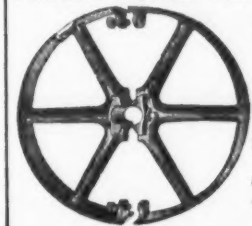
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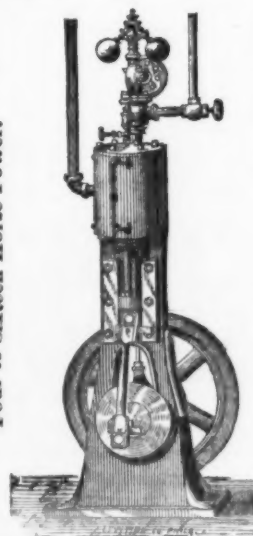
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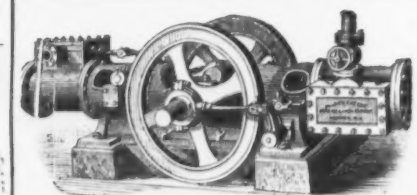
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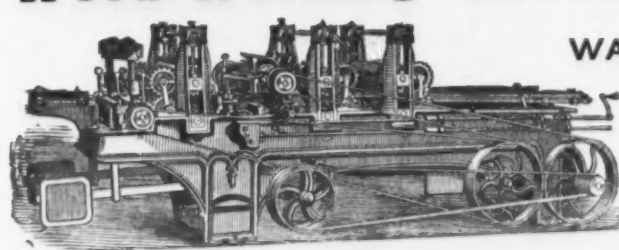
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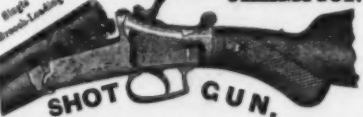
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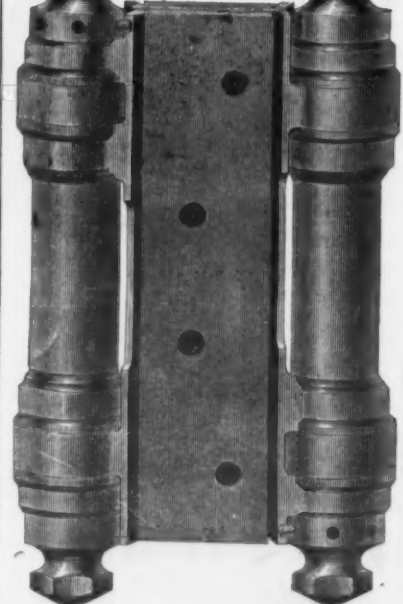
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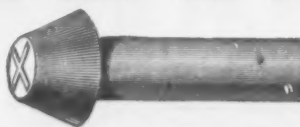
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